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U.S. Department of the Interior
Bureau of Land Management
Wyoming State Office

Casper Field Office December 2000

Belle Ayr 2000 Federal Coal Lease Application Environmental Assessment (WYW151133)

C

2001-008748/NF

NO

MISSION STATEMENT

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BLM/WY/PL-01/002+1320

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NOTE TO READERS:

PLEASE RETAIN YOUR COPY OF THIS DRAFT ENVIRONMENTAL ASSESSMENT. DEPENDING ON THE COMMENTS AND CONCERNS THAT ARE RECEIVED ON THIS DRAFT DOCUMENT, WE ANTICIPATE PREPARING AN ABBREVIATED FINAL ENVIRONMENTAL ASSESSMENT. IN THAT CASE, ONLY CHANGES TO THE DRAFT DOCUMENT WOULD BE NOTED IN THE FINAL, AND YOU WOULD NEED A COPY OF THE DRAFT TO REFER TO.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Casper Field Office
2987 Prospector Drive
Casper, Wyoming 82604-2968

3425 (LBA)
WYW151133
Belle Ayr 2000

DEC [illegible] 2000

Dear Reader:

This copy of the Draft Environmental Assessment (EA) for the Belle Ayr 2000 Coal Lease Application, Bureau of Land Management (BLM) Serial Number WYW151133, is provided for your review and comments. This draft EA has been prepared to analyze the potential environmental and socioeconomic impacts of issuing a Federal coal lease for the Belle Ayr 2000 coal tract located adjacent to the Belle Ayr and Caballo surface coal mines in southeastern Campbell County, Wyoming.

A formal public hearing on the proposed Belle Ayr 2000 coal lease application will be held at 7:00 PM on, Thursday, January 18, 2001, at the Clarion Western Plaza Hotel (formerly the Holiday Inn), 2009 S. Douglas Highway, Gillette, Wyoming. The purpose of the hearing is to receive comments on the proposed coal lease sale, on the fair market value and maximum economic recovery of the Federal coal resources in the proposed Belle Ayr 2000 tract, and on the Draft EA. Prior to the formal hearing, there will be an open house at 6:30 P.M. at the above address to answer questions related to the coal lease-by-application process and this coal lease application.

BLM will accept comments on this Draft EA, as well as on the issues of fair market value of the tracts, and maximum economic recovery of coal in the tracts through January 31, 2001. BLM will publish a Notice of Availability and Notice of Public Hearing in the Federal Register. Federal register notices can be accessed on the Internet at http://www.access.gpo.gov/nara. Comments received after the end of the 30-day comment period will be considered in the Final EA if time permits.

If you wish to comment on the Draft EA, we request that you make your comments as specific as possible. Comments will be more helpful if they include suggested changes, sources, or methodologies. Opinions or preferences will not receive a formal response. However, they will be considered and included as part of the BLM decision making process.

This Draft EA was prepared pursuant to the National Environmental Policy Act and applicable regulations, and other applicable statutes, to address possible environmental and socioeconomic impacts that could result from this project. This Draft EA is not a decision document. Its purpose is to inform the public of the impacts of leasing and mining the Federal coal proposed for lease in a maintenance coal lease application, and to evaluate alternatives to leasing and mining the proposed maintenance coal lease application.

Comments, including names and street addresses of respondents, will be available for public review at the address listed below during regular business hours (7:45 a.m.-4:30 p.m.), Monday through Friday, except holidays, and will be published as part of the Final EA. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

Please send written comments to Bureau of Land Management, Casper Field Office, Attn: Nancy Doelger, 2987 Prospector Drive, Casper, WY 82604. Written comments may also be e-mailed to the attention of Nancy Doelger at "casper_wymail@blm.gov". E-mail comments must include the name and mailing address of the commentor to receive consideration. Written comments may also be faxed to the attention of Nancy Doelger at (307)-261-7587.

If you have any questions or would like to obtain additional copies of this Draft EA, please contact Nancy Doelger at (307) 261-7627, or at the above address.

Sincerely,

for the Field Manager, Casper

DRAFT

ENVIRONMENTAL ASSESSMENT FOR THE BELLE AYR 2000 LEASE APPLICATION (FEDERAL COAL LEASE APPLICATION WYW151133)

Prepared for

U.S. Department of the Interior
Bureau of Land Management
Casper Field Office
Casper, Wyoming

and

Cooperating Agency

U.S. Office of Surface Mining
Reclamation and Enforcement
Denver, Colorado

Prepared by

Environmental Solutions, Inc.
Gillette, Wyoming

December 2000

EXECUTIVE SUMMARY

On July 28, 2000, RAG Wyoming Land Company, Inc. (RAG) filed an application with the Bureau of Land Management (BLM) for a maintenance lease by application (LBA) for federal coal reserves located adjacent to the Belle Ayr Mine. This application was made pursuant to provisions of the Leasing on Application Regulations at 43 Code of Federal Regulations (CFR) 3425.1. The tract applied for, which is referred to as the Belle Ayr 2000 Tract, was assigned case number WYW151133.

The Belle Ayr 2000 Tract is located adjacent to the existing Belle Ayr Mine, approximately 11 miles south of Gillette in Campbell County, Wyoming. The tract covers approximately 243.61 acres and contains about 29 million tons of recoverable coal. The target coal bed in the Belle Ayr 2000 Tract is referred to as the Wyodak or Wyodak-Anderson seam. The coal is sub-bituminous and averages 72 feet in thickness. The active coal mine pit at Belle Ayr Mine is currently adjacent to the Belle Ayr 2000 Tract. Mining activities at Belle Ayr Mine will bypass the Belle Ayr 2000 Tract within the next two years.

The Belle Ayr 2000 Tract is also adjacent to the existing Caballo Mine and could be mined as a maintenance lease for that mine.

RAG had previously applied for a maintenance lease-by-application (LBA) that encompassed the coal resources included in the Belle Ayr 2000 lease application as well as additional coal resources northwest of the Belle Ayr 2000 lease application area on March 20, 1997. They filed a request to modify the 1997 Belle Ayr LBA by withdrawing the lands included in the Belle Ayr 2000 application on July 28, 2000. RAG then filed a separate lease application for the lands withdrawn from the original LBA and included in Belle Ayr 2000 Tract. They requested that BLM consider the Belle Ayr 2000 application immediately so that the potential that the coal would be bypassed could be reduced.

The Powder River Regional Coal Team (RCT) reviewed the request to modify the Belle Ayr 1997 LBA application and the application for the Belle Ayr 2000 LBA application at their public meeting on October 25, 2000 in Cheyenne, Wyoming, and recommended that BLM process it.

This Environmental Assessment (EA) analyzes the potential environmental impacts of issuing a federal coal lease for the Belle Ayr 2000 Tract as required by NEPA and associated rules and guidelines. BLM will use the analysis in this EA to decide whether or not to hold a public, competitive, sealed-bid coal lease sale for the coal included in this tract and issue a federal coal lease. If a sale is held, the bidding at the sale will be open to any qualified bidder. The applicant, RAG, may not be the successful bidder.

The Office of Surface Mining Reclamation and Enforcement (OSM) is a cooperating agency on this EA. If a lease is issued for the Belle Ayr 2000 Tract, OSM will use this analysis in evaluating whether to recommend approval, approval with conditions, or disapproval of the MLA mining plan to the Assistant Secretary of the Interior, Land and

Minerals Management.

This EA analyzes two alternatives:

The Proposed Action is to hold a competitive lease sale and issue a lease to the successful bidder for the federal coal lands included in the Belle Ayr 2000 Tract, as applied for. Under the Proposed Action the Belle Ayr 2000 Tract would be mined as part of an existing mine using existing equipment, facilities and personnel. In early November, 2000, RAG announced that it would be laying off 48 workers at the Belle Ayr and Eagle Butte Mines by the end of the year and cutting production by about 6 million tons, primarily at the Belle Ayr Mine, in 2001.

The active pit at the Belle Ayr Mine is currently adjacent to the Belle Ayr 2000 Tract and the current mining plan calls for backfilling adjacent to the Belle Ayr 2000 Tract until 2002, when mining would move west and south, away from the tract.

If a lease sale is held for the Belle Ayr 2000 Tract and RAG is the successful bidder, the Belle Ayr could continue mining at the current production rate for two to three more years. The Belle Ayr 2000 Tract has lower overburden ratios which would result in less blasting and less overburden handling while the tract is being mined. Employment would not increase. Haul distances would be shorter from the Belle Ayr 2000 Tract to the existing Belle Ayr facilities than from the existing unmined Belle Ayr leases.

Portions of the LBA tract that are adjacent to existing leases at both the Belle Ayr and Caballo Mines will be disturbed under the current mining plans in order to recover the coal in the existing leases. If the Belle Ayr 2000 Tract as applied for is leased to an existing mine as a maintenance lease, the net area of surface disturbance would increase by 118 acres over the No Action Alternative.

If the Belle Ayr 2000 Tract is leased as applied for, Bishop Road would have to be relocated to allow mining of lands occupied by the road. Bishop Road has been realigned in the past to accommodate mining at Belle Ayr Mine and can be relocated again under existing agreements.

There are no federal oil and gas leases and no producing oil or gas wells included in the Belle Ayr 2000 Tract. The Wyoming Oil and Gas Conservation Commission has approved drilling permits for 4 coal bed methane (CBM) wells on the Belle Ayr 2000 Tract, but none of these wells have been drilled, and no pipelines are available in the immediate area. As the surface owner, RAG Wyoming Land Company, Inc. has negotiated agreements with the oil and gas operator that would allow removal of any coal bed methane wells that are completed prior to mining.

The Caballo Mine is also in a position to mine the Belle Ayr 2000 Tract as a maintenance lease. If they acquire the tract, the rate of coal production, mining sequence, equipment, facilities, and timing would be different than if RAG acquired the tract as a maintenance lease. However, if the tract is mined as a maintenance lease for the Caballo Mine, the area of disturbance and the impacts of removing the coal would not be significantly different from the area of disturbance and the impacts of RAG mining the tract.

Alternative 1 , the No Action alternative is to reject the Belle Ayr 2000 lease application. Under this alternative, the Belle Ayr 2000 Tract would not be offered for sale at this time. Portions of the tract would be disturbed when the existing leases at the adjacent mines would be mined and reclaimed under the current approved mining plans.

Without the Belle Ayr 2000 Tract, Belle Ayr mining operations would begin moving into areas with increasing overburden-to-coal stripping ratios, but the capacity to remove overburden is limited by the existing shovel and truck fleets. With this fixed overburden removal capacity, coal production at the Belle Ayr Mine would decline as the stripping ratio increases.

If the tract is not acquired by the Belle Ayr Mine before their adjacent lease is mined and backfilled, it might not be economically feasible for Belle Ayr to re-enter this small peninsula of remaining coal after the adjacent Belle Ayr lease has been mined and reclaimed.

Other alternatives that were considered but not analyzed in detail include holding a competitive sale and issuing a lease to the successful bidder for a lease reconfigured by BLM to avoid bypassing coal or improve maximum economic recovery and/or fair market value and delaying the competitive sale of the tract.

The Belle Ayr 2000 Tract is surrounded on three sides by existing coal leases at the Belle Ayr and Caballo Mines. The coal included in the tract represents about three years of production at current mining rates at the Belle Ayr Mine. The surface of the LBA tract will be disturbed in order to remove the coal from these existing leases under the already approved mining plans for these two mines. Topography, and water, soil, vegetation and wildlife resources would be disturbed on an additional 118 acres in order to remove the coal from the LBA tract. There are no alluvial valley floors or wetlands located on the tract. Air quality impacts would not be increased while the tract is mined because the overburden is thinner and the haul distances are shorter on the tract than on the remaining unmined areas of the Belle Ayr Mine. Cultural resources on the tract would be impacted by mining, but adverse impacts would be mitigated through data recovery and/or avoidance of significant properties. No significant cultural or paleontological properties have been identified in the course of surveys that have already been done on the tract. No Native American concerns have been identified on the tract. Noise and visual resource impacts related to mining the adjacent leases would be extended onto the tract. The surface of the tract is privately owned, so not access to public lands would be affected if the tract is leased and mined. There are no federal oil and gas leases and no existing oil and gas wells on the tract. Bishop Road, an active underground telephone line, and an overhead

7

power line that cross the Belle Ayr 2000 Tract would have to be relocated in order to recover all of the coal included in the tract. The county, state, and federal governments would benefit from bonus payment, royalties, and taxes that would be paid if the coal is mined, and employment would be extended at the Belle Ayr Mine.

Leasing the Belle Ayr 2000 Tract would slightly increase the total area that would be affected by mining but would not cause a cumulative change in daily impacts because it is an extension of an ongoing operation and mining disturbance is progressive with reclamation proceeding contemporaneously. There would be no major cumulative impacts related to mining the tract.

TABLE OF CONTENTS

Executive Summary ES-1

1 PURPOSE OF, AND NEED FOR, THE PROPOSED ACTION 1-1
1.1 Background 1-1
1.2 Purpose and Need 1-3
1.3 Federal Coal Leasing Activity 1-5
1.4 Regulatory Authority and Responsibility 1-5
1.5 Conformance With Land Use Plan 1-10
1.6 Relationship to Statutes, Regulations, or Other Plans 1-13
1.7 Consultation and Coordination 1-14

2 PROPOSED ACTION AND ALTERNATIVES 2-1
2.1 Proposed Action 2-1
2.2 Alternative 1 (No Action) 2-5
2.3 Alternatives Considered But Not Analyzed in Detail 2-5
2.3.1 Alternative 2 2-5
2.3.2 Alternative 3 2-6
2.4 Comparison of Alternatives 2-7

3 THE AFFECTED ENVIRONMENT 3-1
3.1 General Setting 3-1
3.2 Topography and Physiography 3-2
3.3 Geology 3-2
3.4 Soils 3-2
3.5 Air Quality 3-4
3.6 Water Resources 3-6
3.6.1 Groundwater 3-6
3.6.2 Surface Water 3-8
3.6.3 Water Rights 3-8
3.7 Alluvial Valley Floors 3-11
3.8 Wetlands 3-13
3.9 Vegetation 3-13
3.10 Wildlife 3-14
3.10.1 Wildlife Resources 3-14
3.10.2 Big Game 3-14
3.10.3 Other Mammals 3-15
3.10.4 Raptors 3-16
3.10.5 Game Birds 3-19
3.10.6 Other Avian Species 3-20
3.10.7 Fishes 3-20
3.10.8 Threatened and Endangered Species 3-20

TABLE OF CONTENTS

3.10.9 Migratory Birds of High Federal Interest 3-21
3.11 Ownership and Use of Land 3-22
3.12 Cultural Resources 3-23
3.13 Paleontological Resources 3-23
3.14 Visual Resources 3-23
3.15 Noise 3-24
3.16 Transportation Facilities 3-24
3.17 Socioeconomics 3-26
3.17.1 Population 3-26
3.17.2 Local Economy 3-26
3.17.3 Employment 3-27
3.17.4 Housing 3-28
3.17.5 Local Government Facilities and Services 3-28
3.17.6 Social Conditions 3-29
3.17.7 Environmental Justice 3-29
3.18 Hazardous and Solid Waste 3-30

4 ENVIRONMENTAL CONSEQUENCES 4-1
4.1 Direct and Indirect Impacts of Action Alternatives 4-3
4.1.1 Topography and Physiography 4-3
4.1.2 Geology and Minerals 4-4
4.1.3 Soils 4-5
4.1.4 Air Quality 4-6
4.1.5 Water Resources 4-8
4.1.5.1 Groundwater 4-8
4.1.5.2 Surface Water 4-9
4.1.6 Alluvial Valley Floors 4-11
4.1.7 Wetlands 4-11
4.1.8 Vegetation 4-11
4.1.9 Wildlife 4-12
4.1.10 Land Use 4-14
4.1.11 Cultural Resources 4-15
4.1.12 Paleontological Resources 4-15
4.1.13 Visual Resources 4-15
4.1.14 Noise 4-16
4.1.15 Transportation Facilities 4-16
4.1.16 Socioeconomics 4-16
4.1.17 Hazardous and Solid Waste 4-18

4.2 No-Action Alternative 4-18

TABLE OF CONTENTS

4.3 Regulatory Compliance, Mitigation and Monitoring 4-19

4.4 Residual Impacts 4-20

4.5 Cumulative Impacts 4-20
4.5.1 Topography and Physiography 4-30
4.5.2 Geology 4-30
4.5.3 Soils 4-31
4.5.4 Air Quality 4-31
4.5.5 Water Resources 4-33
4.5.5.1 Groundwater 4-33
4.5.5.2 Surface Water 4-40
4.5.6 Alluvial Valley Floors 4-42
4.5.7 Wetlands 4-42
4.5.8 Vegetation 4-42
4.5.9 Wildlife 4-43
4.5.10 Land Use 4-46
4.5.11 Cultural Resources 4-47
4.5.12 Native American Consultation 4-47
4.5.13 Paleontological Resources 4-47
4.5.14 Visual Resources 4-48
4.5.15 Noise 4-48
4.5.16 Transportation Facilities 4-49
4.5.17 Socioeconomics 4-49

4.6 The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity 4-51

4.7 Irreversible and Irretrievable Commitments of Resources 4-52

5 CONSULTATION AND COORDINATION 5-1

6 REFERENCES 6-1

7 GLOSSARY 7-1

//

TABLE OF CONTENTS

TABLES

1-1 Leases Issued Since Decertification, Powder River Basin, Wyoming 1-6
1-2 LBA's and Modifications Pending, Powder River Basin, Wyoming 1-7
1-3 Unsuitability Criteria for the Belle Ayr 2000 Tract 1-11

2-1 Wyoming Oil and Gas Conservation Commission Oil and Gas Well Permits within the Belle Ayr 2000 Tract 2-8
2-2 Comparison of Coal Production, Surface Disturbance and Mine Life for Belle Ayr Mine and Belle Ayr 2000 Tract LBA 2-9

3-1 Belle Ayr 2000 Tract Soils Descriptions 3-3
3-2 Regulated Air Emissions for Selected Ambient Air Quality Standards 3-5
3-3 Maximum Allowable Increases for Prevention of Significant Deterioration of Air Quality: Particulates 3-6
3-4 Wyoming State Engineer's Office Groundwater Rights 3-9
3-5 Wyoming State Engineer's Office Surface Water Rights 3-12
3-6 Relationship Between A-Scale Decibel Readings and Sounds of Daily Life 3-25
3-7 Estimated 2000 Fiscal Revenues from 1999 Coal Production in Campbell County 3-27

4-1 Comparison of Existing and Proposed Disturbance Area and Mining Operations 4-2
4-2 Belle Ayr Mine Historic Production and Air Quality Data 4-7
4-3 Status of Wyoming Powder River Basin Coal Mines 4-23
4-4 Coal Production and Development Levels: Campbell and Converse Counties, Wyoming 4-24

4-5 Predicted and Actual Coal Mine Disturbance and Reclamation: Campbell and Converse Counties, Wyoming 4-28

FIGURES

1-1 General Location Map with Federal Coal Leases and LBAs 1-2
1-2 Belle Ayr Mine Federal Coal Leases and Belle Ayr 2000 Tract as Applied For 1-4
2-1 Belle Ayr 2000 Tract General Area Map 2-2
4-1 Life of Mine Prediction Drawdown with Maximum Modeled CBM Contours Superimposed 4-10

TABLE OF CONTENTS

APPENDICES

A Federal and State Permitting Requirements and Agencies .... App. A-1
B BLM Special Coal Lease Stipulations .... App. B-1
C Threatened and Endangered Species .... App. C-1
D Regulatory Compliance, Mitigation and Monitoring Measures Required by Stipulation or Required by State or Federal Law ...... App. D-1
E Summary of Horse Creek EIS Cumulative Air Quality Analysis Results .... App. E-1

13

Abbreviations and Acronyms Used in this Report

ANC	acidification neutralization capacity
AQD	Air Quality Division, Wyoming Department of Environmental Quality
AQRV	Air quality related values
ARCO	Atlantic Richfield Company
AREV	SEO water rights database and program
AUM	animal unit month
AVF	alluvial valley floor
BACT	Best Available Control Technology
bcy	bank cubic yards
BLM	Bureau of Land Management, US Department of the Interior
BN-UP, BN&UP	Burlington Northern-Union Pacific
Btu	British Thermal Unit
CBM	coal bed methane
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CHIA	Cumulative Potential Hydrologic Impacts Assessment
CO	carbon monoxide
COE	US Army Corps of Engineers
dBA	A-weighted scale, decibels
DM&E	Dakota, Minnesota and Eastern Railroad Corporation
EA	environmental assessment
EIS	environmental impact statement
EPA	US Environmental Protection Agency
FCLAA	Federal Coal Leasing Amendments Act of 1976
FLPMA	Federal Land Policy Management Act of 1976
GAGMO	Gillette Area Groundwater Monitoring Organization (coal operators)
GNP	Gross National Product
GSP	Gross State Product
gpm	gallons per minute (equivalent to 0.002 cfs, approximately)
IBLA	Interior Board of Land Appeals
LAC	limits of acceptable change (re: air quality)
LBA	lease by application
LMU	logical mining unit
LQD	Land Quality Division, Wyoming Department of Environmental Quality
MBHFI	migratory birds of high federal interest
mcf	thousand cubic feet
mmtpy	million tons per year
µeq/l	microequivalents per liter
mg/l	milligrams per liter (1 mg = 1 ppm [part per million]; 1 liter = 0.264 gallons)

Abbreviations and Acronyms Used in this Report

μg/m3	micrograms per cubic meter (1 cubic meter = 1.308 cubic yards)
MLA	Mineral Leasing Act of 1920
μmhos/cm	micromhos per centimeter {thousandths of unit of specific conductance) (a measure of electrical conductivity)
Mw	megawatts
NAAQS	National Ambient Air Quality standards
NEPA	National Environmental Policy Act of 1969
NO_x	nitrogen oxides
NRCS	Natural Resources Conservation Service, US Department of Agriculture
NRHP	National Register of Historic Places
O_3	Ozone
OSM	Office of Surface Mining Reclamation and Enforcement
pH	acidity, measured in standard units
PM_{10}	particulates finer than 10 microns (respirable)
PRB	Powder River Basin
PSD	prevention of significant deterioration
PRRCT	Powder River Regional Coal Team
RCRA	Resource Conservation and Recovery Act
RMP	resource management plan
ROW	right-of-way
SARA	Superfund Amendments and Reauthorization Act of 1986
SHPO	State Historic Preservation Officer
SEO	State Engineer's Office
SMCRA	Surface Mining Control and Reclamation Act of 1977
SO2	sulfur dioxide
TDS	total dissolved solids
TSS	total suspended solids
T&E	threatened and endangered
TSP	total suspended particulates
US	United States
USDA	US Department of Agriculture
USDI	US Department of the Interior
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	Geological Survey, United States Department of the Interior
UW	University of Wyoming
VRM	Visual Resource Management
WCIC	Wyoming Coal Information Council
WDEQ	Wyoming Department of Environmental Quality
WDEQ/LQD	Wyoming Department of Environmental Quality/Land Quality Division
WDEQ/AQD	Wyoming Department of Environmental Quality/Air Quality Division
WMA	Wyoming Mining Association
WOGCC	Wyoming Oil and Gas Conservation Commission

1 PURPOSE OF, AND NEED FOR, THE PROPOSED ACTION

1.1 BACKGROUND

On July 28, 2000, RAG Wyoming Land Company, Inc. (RAG) filed an application with the Bureau of Land Management (BLM) for a maintenance lease by application (LBA) for Federal coal reserves located adjacent to the Belle Ayr Mine. This application was made pursuant to provisions of the Leasing on Application Regulations at 43 Code of Federal Regulations (CFR) 3425.1. The tract applied for, which is referred to as the Belle Ayr 2000 Tract, was assigned case number WYW151133.

The Belle Ayr 2000 Tract is located adjacent to the existing Belle Ayr Mine, approximately 11 miles south of Gillette in Campbell County, Wyoming (Figure 1-1). The tract covers approximately 243.61 acres and contains about 29 million tons of recoverable coal.

The Belle Ayr 2000 Tract is located in the Powder River Federal Coal Region, which was decertified in 1990. RAG applied for a maintenance lease-by-application (LBA) that encompassed the coal resources included in the Belle Ayr 2000 lease application as well as additional coal resources northwest of the Belle Ayr 2000 lease application area on March 20, 1997 (Figure 1-1). This LBA application (referred to as the Belle Ayr 1997 LBA) was reviewed by the Powder River Regional Coal Team (RCT) at their April 23, 1997 public meeting in Casper, Wyoming and at their October 27, 1999 public meeting in Gillette, Wyoming. RAG presented information about the existing mine and pending lease application to the RCT at both meetings. The RCT recommended that the BLM process the LBA application.

On July 28, 2000, RAG filed a request to modify the 1997 Belle Ayr LBA by withdrawing the lands included in the Belle Ayr 2000 application so that the Belle Ayr 2000 application could be considered immediately and the potential that the coal would be bypassed could be reduced. RAG then filed a separate lease application for the lands withdrawn from the original LBA and included in Belle Ayr 2000 Tract. The RCT reviewed the request to modify the Belle Ayr 1997 LBA application and the application for the Belle Ayr 2000 LBA application at their public meeting on October 25, 2000 in Cheyenne, Wyoming. RAG presented information about their request to modify the Belle Ayr 1997 application at that meeting. The RCT recommended that BLM process the Belle Ayr 2000 lease application.

In order to process an LBA, BLM must evaluate the quality, quantity, maximum economic recovery, and fair market value of the Federal coal included in the tract and fulfill the requirements of the National Environmental Policy Act (NEPA). This Environmental Assessment (EA) analyzes the potential environmental impacts of issuing a federal coal lease for the Belle Ayr 2000 Tract as required by NEPA and associated rules and guidelines. BLM will use the analysis in this EA to decide whether or not to hold a public, competitive, sealed-bid coal lease sale for the coal included in this tract and issue a federal coal lease.

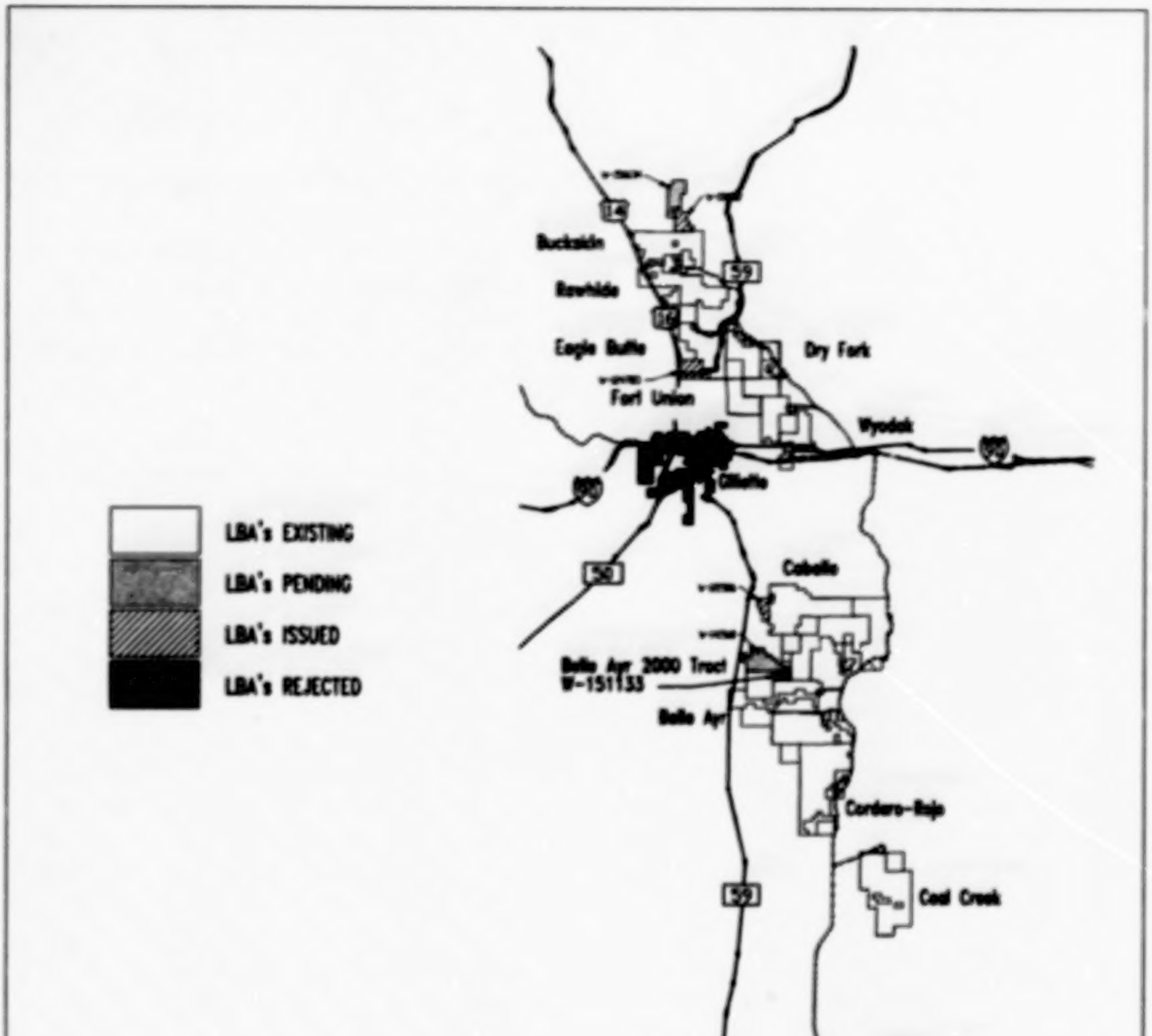


Figure 1-1. General Location Map with Federal Coal Leases and LBA's.

tract, as determined by BLM. If a sale is held, the bidding at the sale will be open to any qualified bidder. The applicant, RAG, may not be the successful bidder.

The Belle Ayr 2000 lease application is contiguous with the existing Belle Ayr Mine, and could be mined as a maintenance lease for that mine. The lease application area is also contiguous with the existing Caballo Mine, operated by the Powder River Coal Company, and could be mined as a maintenance lease for that mine.

The proposed lease area is within a region that has been evaluated by several regional Federal EISs and the 1985 BLM Buffalo Resource Management Plan (RMP). The tract as applied for is bordered on three sides by existing leases at the two adjacent mines (Figure 1-1). Detailed site-specific environmental data have been collected for the lands included in the permit areas for both adjacent mines, and environmental analyses have previously been prepared to secure the existing leases and the necessary mining permits for each mine. Detailed site-specific environmental data have been collected on the lease application area because it is overlapped by the permit areas for both the Belle Ayr and Caballo mines.

Other agencies may use this analysis to make decisions relating to leasing and mining the federal coal in this tract. The Office of Surface Mining Reclamation and Enforcement (OSM), the federal agency responsible for regulating surface coal mining operations, is a cooperating agency on this EA. OSM will use this EA to make decisions related to the approval of the MLA mining plan for this tract, if a lease is issued.

The Belle Ayr 2000 Tract as applied for and the existing federal coal leases in the adjacent Belle Ayr Mine are shown on Figure 1-2. If the applicant, RAG Wyoming Land Company, acquires the Belle Ayr 2000 Tract, the coal would be mined, processed, and distributed as part of the permitted Belle Ayr Mine. The tract would be mined as a maintenance tract using the existing facilities and equipment. The mining method would be truck and shovel, which is the mining method currently in use at the Belle Ayr Mine.

1.2 PURPOSE AND NEED

The Belle Ayr Mine is operated by RAG Coal West, Inc. (RAG). According to the July 28, 2000 application received from RAG, the Belle Ayr 2000 tract is in an area with lower overburden-to-coal ratios than are available for mining in the existing leases at the Belle Ayr Mine and the mine needs this lower strip-ratio coal to remain competitive in today's coal market. The active coal mine pit at Belle Ayr Mine is currently adjacent to the Belle Ayr 2000 Tract. Mining activities at Belle Ayr Mine will bypass the Belle Ayr 2000Tract within the next two years. The existing mine plan at Belle Ayr Mine calls for mining and/or backfilling adjacent to the Belle Ayr 2000 Tract until the year 2002. By early 2002, the Belle Ayr Mine operation will be advancing west and south, away from the Belle Ayr 2000 Tract. Belle Ayr could enter the Belle Ayr 2000 Tract in 2001, when the Belle Ayr Mine operation is adjacent to it. If the Belle Ayr 2000 Tract is not leased until after the adjacent

18

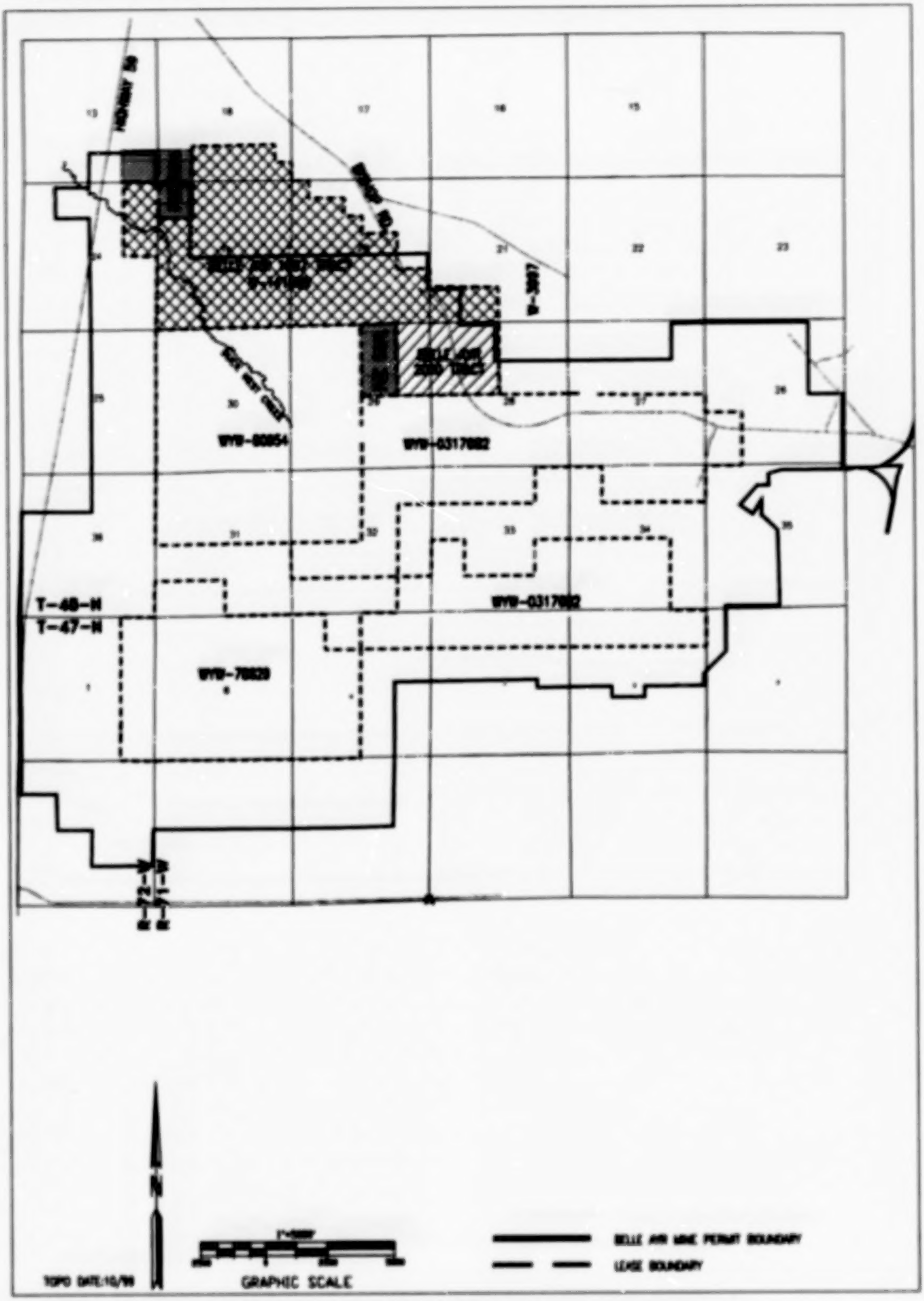


Figure 1-2. Belle Ayr Mine Federal Coal Leases and Belle Ayr 2000 Tract as Applied for.

19

Belle Ayr lease areas have been mined, the cost to reestablish a pit in the LBA Tract would be high enough to prohibit a return by Belle Ayr to the area in the foreseeable future. According to RAG, with the current coal market conditions, once the adjacent Belle Ayr leases are mined, they would be backfilled to minimize long-term reclamation and bonding obligations and near-term haulage costs.

If the Belle Ayr 2000 Tract is leased to the Belle Ayr Mine as a maintenance tract, the mining and reclamation permit would have to be amended before the coal in the new lease could be mined.

If the coal included in the Belle Ayr 2000 tract is bypassed by the Belle Ayr mining operations, the federal coal resources included in the tract could potentially be leased and recovered by the Caballo Mine when they mine their adjacent federal lease (WYW3397).

1.3 FEDERAL COAL LEASING ACTIVITY

Since decertification of the Powder River Federal Coal Region, ten federal coal leases have been sold in the Wyoming portion of the Powder River Federal Coal Region using the LBA process and one federal coal lease has been exchanged (Table 1-1). As shown in Table 1-2, eight applications, including the Belle Ayr 2000 Tract, are currently pending. One application (State Section) was withdrawn in September, 2000.

1.4 REGULATORY AUTHORITY AND RESPONSIBILITY

The RAG coal lease application was submitted and will be processed and evaluated under the following authorities:

- MLA, as amended;
- the Multiple-Use Sustained Yield Act of 1960;
- NEPA;
- FCLAA;
- FLPMA; and
- SMCRA.

The BLM is the lead agency responsible for leasing federal coal lands under the MLA as amended by FCLAA and is also responsible for preparation of this EA to evaluate the potential environmental impacts of issuing a coal lease. For the Belle Ayr 2000 application, the BLM must decide whether to hold a competitive, sealed-bid lease sale for the tract as applied for, hold a competitive sealed bid lease sale for a modified tract, or reject the current lease application and not offer the tract for sale at this time.

The Belle Ayr 2000 LBA Tract is included in the area covered by the BLM Buffalo Resource Management Plan, (BLM, 1985). There are no federal surface lands managed by the USFS included in the Belle Ayr 2000 LBA Tract. As a result, the USFS is not a cooperating agency on this EA and USFS consent will not be required if a lease sale is held.

Table 1-1
LEASES ISSUED SINCE DECERTIFICATION, POWDER RIVER BASIN, WYOMING

LBA/EXCHANGE NAME (LEASE #) APPLICANT or APPLICANT MINE	APPLICATION DATE EFFECTIVE DATE	ACRES*	MINEABLE TONS OF COAL*	SUCCESSFUL BID	SUCCESSFUL BIDDER
Jacobs Ranch LBA (WYW117924) Jacobs Ranch Mine	10/10/89 10/1/92	1,708.620	147,423,560	$20,114,930.00	Jacobs Ranch Mine
W. Black Thunder LBA (WYW118907) Black Thunder Mine	12/22/89 10/1/92	3,492.495	429,048,216	$71,909,282.69	Black Thunder Mine
N. Antelope/Rochelle LBA (WYW119554) North Antelope/Rochelle Mine	3/2/90 10/1/92	3,064.040	403,500,000	$86,987,765.00	North Antelope/ Rochelle Mine
W. Rocky Butte LBA (WYW122586) No Existing Mine**	12/4/90 1/1/93	463.205	56,700,000	$16,500,000.00	Rocky Butte Mine
Eagle Butte LBA (WYW124783) Eagle Butte Mine	7/25/91 8/1/95	1,059.175	166,400,000	$18,470,400.00	Eagle Butte Mine
Antelope LBA (WYW128322) Antelope Mine	1/29/92 2/1/97	617.200	60,364,000	$9,054,600.00	Antelope Mine
North Rochelle LBA (WYW127221) North Rochelle Mine	7/22/92 1/1/98	1,481.930	157,610,000	$30,576,340.00	North Rochelle Mine
Powder River LBA (WYW136142) North Antelope/Rochelle Mine	3/23/95 9/11/98	4,224.225	532,000,000	$109,596,500.00	North Antelope/ Rochelle Mine
Thundercloud LBA (WYW136458) Jacobs Ranch Mine	4/14/95 1/1/99	3,545.503	412,000,000	$158,000,008.50	Black Thunder Mine
EOG (Belco) I-90 Lease Exchange (WYW150152) EOG (formerly Belco)	Issued pursuant to Public Law 95-554, lease effective 4/1/00	599.17	106,000,000	Exchanged for rights to Belco I-90 Lease (WYW0322794)	EOG(Belco)
Horse Creek (WYW141435) Antelope Mine	2/14/97 12/1/00	2,818.695	275,577,000	$91,220,120.70	Kennecott
TOTALS		**23,074.258**	**2,471,045,776**	**$612,429,856.89**	

Table 1-2
LBA'S PENDING, POWDER RIVER BASIN, WYOMING

LBA (CASE FILE #) APPLICANT MINE	APPLICATION DATE	ACRES	ESTIMATED TONS OF COAL[1]	STATUS
Belle Ayr 2000 (WYW151133) Belle Ayr	7/28/00	243.61	29 mm	RCT reviewed 10/25/00
N. Jacobs Ranch[2](WYW146744) Jacobs Ranch	10/2/98	4,821.19	519.0 mm	RCT reviewed 2/23/99 & 10/27/99
State Section[2] (WYW149882) New Start Mine	1/31/00			Withdrawn
NARO (WYW150210) North Antelope/ Rochelle	3/10/00	4,501.0 Total N. Parcel = 2,368.3; S. Parcel = 2,132.7	564.0 total N. Parcel = 323.0 mm S. Parcel = 241.0 mm	RCT reviewed 10/25/00
Little Thunder (WYW150318) Black Thunder	3/23/00	2,709.5	About 384 mm	RCT reviewed 10/25/00
West Roundup (WYW151134) North Rochelle	7/28/00	1,868.12	173 mm	RCT reviewed 10/25/00
North Hay Creek (WYW151634) Buckskin	8/31/00	1,015.51	135 mm	RCT reviewed 10/25/00
West Antelope (WYW151643) Antelope	9/12/00	3,500.84	292.5 mm	RCT reviewed on 10/25/00
Belle Ayr 1997 (WYW41568) Belle Ayr	3/20/97	1,335.39	171 mm	RCT reviewed 4/23/97 & 10/27/99
ESTIMATED TOTAL PENDING LBAS		**19,995.16**	**2,267.5 mm**	

[1] The estimated coal reserves for the N. Jacobs Ranch and West Roundup tracts are the estimated geologically in-place coal reserves included in those tracts. The estimated coal reserves for the Horse Creek, Belle Ayr, NARO , and Little Thunder tracts are the estimated mineable reserves.

[2] The State Section tract includes all of the New Keeline Tract (WYW138975), which was applied for 1996 and rejected in1997. The rejection is under appeal to the IBLA. The State Section LBA includes all but 80 acres of the pending N. Jacobs Ranch Tract. The areas of overlap of acres and tons of coal applied for have been estimated so that the overlap between the State Section and N. Jacobs Ranch tracts is not counted twice.

Table 1-2
MODIFICATIONS PENDING, POWDER RIVER BASIN, WYOMING

MODIFICATION (CASE FILE #) MINE	APPLICATION DATE	ACRES	ESTIMATED TONS OF COAL*	STATUS
N.Antelope/Rochelle(WYW136142) North Antelope/Rochelle	6/19/00	19.97	2.6 mm	Application in review
North Rochelle (WYW 127221) North Rochelle	7/26/00	116.92	10.69 mm	Application in review
ESTIMATED TOTAL PENDING MODIFICATIONS		**136.39**	**13.29 mm**	

EXCHANGES PENDING, POWDER RIVER BASIN, WYOMING

P&M	Proposed exchange of private surface/minerals for federal coal	Acres offered to be determined by fair market value analysis	Tons of coal offered to be determined by fair market value analysis	Presented to RCT at 10/27/99 meeting

OSM is a cooperating agency on this EA. After a coal lease is issued, SMCRA gives OSM primary responsibility to administer programs that regulate surface coal mining operations and the surface effects of underground coal mining operations. Pursuant to Section 503 of SMCRA, the Wyoming Department of Environmental Quality (WDEQ) developed, and in November 1980 the Secretary of the Interior approved, a permanent program authorizing WDEQ to regulate surface coal mining operations and surface effects of underground mining on nonfederal lands within the state of Wyoming. In January 1987, pursuant to Section 523(c) of SMCRA, WDEQ entered into a cooperative agreement with the Secretary of the Interior authorizing WDEQ to regulate surface coal mining operations and surface effects of underground mining on federal lands within the state.

Pursuant to the cooperative agreement, a federal coal lease holder in Wyoming must submit a permit application package to OSM and the Land Quality Division of WDEQ (WDEQ/LQD) for any proposed coal mining and reclamation operations on federal lands in the state. WDEQ/LQD reviews the permit application package to insure the permit application complies with the permitting requirements and the coal mining operation will meet the performance standards of the approved Wyoming program. OSM, BLM, and other federal agencies review the permit application package to insure it complies with the terms of the coal lease, the MLA, NEPA, and other federal laws and their attendant regulations. If the permit application package does comply, WDEQ issues the applicant a permit to conduct coal mining operations. OSM recommends approval, approval with conditions, or disapproval of the MLA mining plan to the Assistant Secretary of the Interior, Land and Minerals Management. Before the MLA mining plan can be approved, the BLM must concur with this recommendation.

If the proposed LBA Tract is leased to an existing mine, the lessee would be required to revise their coal mining permit prior to mining the coal, following the processes outlined above. As a part of that process, a new mining and reclamation plan would be developed showing how the lands in the LBA Tract would be mined and reclaimed. The revised permit area would be larger than the revised lease area in order to allow for disturbance outside the actual coal removal areas for such purposes as matching to undisturbed topography, constructing flood control and sediment control facilities, and related activities. Specific impacts which would occur during the mining and reclamation of the LBA Tract would be addressed in the mining and reclamation plans, and specific mitigation measures for anticipated impacts would be described in detail at that time.

WDEQ enforces the performance standards and permit requirements for reclamation during a mine's operation and has primary authority in environmental emergencies. OSM retains oversight responsibility for this enforcement. BLM has authority in those emergency situations where WDEQ or OSM cannot act before environmental harm and damage occurs.

BLM also has the responsibility to consult with and obtain the comments of other state or federal agencies which have jurisdiction by law or special expertise with respect to potential environmental impacts. Appendix A presents other federal and state permitting requirements that must be satisfied to mine this LBA Tract.

24

1.5 CONFORMANCE WITH LAND USE PLAN

The BLM's principal authority to manage public lands is established by the Federal Land Policy and Management Act of 1976 (FLPMA; PL 94-579, 43 USCA §§ 1701-1782 [Supp. 1977]). Under this act, the BLM is responsible for managing resources on public lands in a manner that maintains or improves them. The BLM planning regulations are set forth in 43 CFR 1600.

FCLAA requires that lands considered for coal leasing be included in a comprehensive land use plan and that leasing decisions be compatible with that plan. The Buffalo RMP and its associated EIS is the plan which governs the management of lands and minerals in Campbell County (BLM 1985) as well as Johnson, and Sheridan Counties.

Coal land use planning involves four planning screens to determine whether the subject coal is acceptable for further lease consideration. The four coal screens are:

- development potential of the coal lands;
- unsuitability criteria application;
- multiple land use decisions that eliminate federal coal deposits; and
- surface owner consultation.

Only those federal coal lands that pass these screens are given further consideration for leasing. These coal screens were applied to federal coal lands in Campbell County in the early 1980s by the BLM. The results were published in the Buffalo RMP in 1985. These screens were again applied to federal coal lands in Campbell and Converse Counties by BLM in 1993, and a report was prepared in 1997.

A coal tract that is acceptable for further consideration for leasing must be located within areas that have been determined to have coal development potential. The lands in this coal lease application are within the area identified as having coal development potential by the BLM both the 1985 and 1993 coal screening analyses.

The coal leasing unsuitability criteria listed in the federal coal management regulations (43 CFR 3461) have been applied to the lease application area. Table 1-3 summarizes the unsuitability criteria, describes the general findings for the Buffalo RMP, and presents a validation of these findings for the Belle Ayr 2000 Tract. Criterion 3 pertains to dwellings, roads, cemeteries, and public buildings. Lands within 100 feet of the right-of-way for Bishop Road, a public county road which crosses the tract, were not determined to be unsuitable for mining because the road could be relocated to accommodate mining. As indicated in Table 1-3 , none of the lands located on the tract were found unsuitable for leasing, and therefore the tract is available for further consideration for leasing.

Surface owner consultation in the area of high coal development potential was completed during preparation of the 1985 RMP, and qualified private surface owners with land over

25

Table 1-3
Unsuitability Criteria for the Belle Ayr 2000 Tract

Unsuitability Criteria	Findings from the BRA RMP*	Validation for the Belle Ayr 2000 Tract
1. *Federal Land Systems.* All federal lands included in the following systems are unsuitable for leasing: National parks, National wildlife refuges, National Systems of trails, National wilderness preservation system, National wild and scenic rivers, National recreation lands, lands acquired through the Land and Water Conservation Fund, National forests, and federal lands in incorporated cities and towns.	None of the listed federal land categories are present within the Buffalo coal development review area.	Not applicable to the tract.
2. *Rights-of-way (ROW) and Easements.* Federal lands that are within ROWs or easements or within surface leases for residential, commercial, industrial, or other public purposes, on federally owned surface are unsuitable for leasing.	The surface lands are entirely owned by RAG Wyoming Land Co. Inc. There is no federal surface on the Belle Ayr 2000 Tract.	No ROWs are on the tract; the area is available for further consideration.
3. *Dwellings, Roads, Cemeteries, and Public Buildings.* Federal lands within 100 feet of a right-of-way of a public road or a cemetery or within 300 feet of any public building, school, church, community, or institutional building, public park, or an occupied dwelling.	No dwellings, roads, cemetaries, or public buildings located on the Belle Ayr 2000 Tract were determined unsuitable.	There are no buildings or cemeteries that would make the Belle Ayr 2000 Tract unavailable for further consideration. Bishop Road is considered suitable pending development of a plan to move the road prior to mining.
4. *Wilderness Study Areas (WSA).* Federal lands designated as wilderness study areas are unsuitable while under review for possible wilderness designation.	No lands within the review area are within a wilderness study area.	There are no unsuitable findings; the tract is available for further consideration.
5. *Lands with Outstanding Scenic Quality.* Scenic federal lands designated by visual resource management analysis Class I (outstanding visual quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks are unsuitable.	No lands in the review area meet the scenic criteria as outlined.	There are no unsuitable findings; the tract is available for further consideration.
6. *Land Used for Scientific Study.* Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations are unsuitable for the duration of the study except where mining would not jeopardize the purpose of the study.	No lands in the review area are under permit.	There are no unsuitable findings; the tract is available for further consideration.
7. *Historic Lands and Sites.* All publicly or privately owned places which are included in or eligible for inclusion in the National Register of Historic Places (NRHP) and an appropriate buffer zone are unsuitable. Sites with potential for listing on the NRHP will be review with the State Historic Preservation Office (SHPO) for acceptability for mining if they are under consideration for leasing.	On the basis of consultation with the SHPO there were no unsuitable findings under this criteria in the review area. No sites in the area are listed on the NRHP.	There are no unsuitable findings; the tract is available for further consideration.
8. *Natural Areas.* Federal lands designated as natural areas or National Natural Landmarks are unsuitable.	No lands in the Belle Ayr 2000 tract are designated as natural areas or as National Natural Landmarks.	There are no unsuitable findings, and the Belle Ayr tract is not unsuitable for mining.
9. *Critical Habitat for Threatened or Endangered (T&E) Plant and Animal Species.* Federally designated critical habitat for T&E plant and animal species and scientifically documented essential habitat for T or E species are unsuitable.	There is no habitat meeting federally designated criterion for T&E plant or animal species within the Belle Ayr tract..	There are no unsuitable findings, and the Belle Ayr tract is not unsuitable for mining. See Appendix C for a detailed discussion of T&E Species.
10. *State Listed Species.* Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as T&E shall be considered unsuitable.	Wyoming does not maintain a state list of T&E species of plants or animals. Therefore, this criterion does not apply.	There are no unsuitable findings, and the Belle Ayr tract is not unsuitable for mining.
11. *Bald or Golden Eagle Nests.* An active bald or golden eagle nest and appropriate buffer zone are unsuitable unless the lease can be conditioned so that eagles will not be disturbed during breeding season or unless golden eagle nests will be moved.	There are no eagle nests or buffer zones in the Belle Ayr tract.	There are no unsuitable findings, and the Belle Ayr tract is not unsuitable for mining.

Table 1-3
Unsuitability Criteria for the Belle Ayr 2000 Tract

Unsuitability Criteria	Findings from the BRA RMP[a]	Validation for the Belle Ayr 2000 Tract
12. *Bald and Golden Eagle Roost and Concentration Areas.* Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering are unsuitable unless mining can be conducted in such a way as to ensure that eagles shall not be adversely disturbed.	No bald or golden eagle roost or concentration areas occur on the Belle Ayr tract. Mining planned in the review area is not likely to jeopardize the continued existence of the bald eagle. Coal leasing can occur and adequate protection can be provided.	There are no unsuitable findings, and the Belle Ayr tract is not unsuitable for mining.
13. Federal lands containing active falcon (excluding kestrel) cliff nesting sites and a suitable buffer zone shall be considered unsuitable unless mining can be conducted in such a way as to ensure the falcons will not be adversely affected.	No cliff nesting sites or buffer zones occur in the Belle Ayr tract.	There are no unsuitable findings, and the Belle Ayr tract is not unsuitable for mining.
14. *Habitat for Migratory Bird Species.* Federal lands which are high priority habitat for migratory bird species of high federal interest shall be considered unsuitable unless mining can be conducted in such a way as to ensure that migratory bird habitat will not be adversely affected during the period it is in use.	No high priority habitat for migratory bird species of high federal interest occurs on the Belle Ayr tract.	There are no unsuitable findings, and the Belle Ayr tract is not unsuitable for mining.
15. *Fish and Wildlife Habitat for Resident Species.* Federal lands which the surface management agency and state jointly agree are fish and wildlife habitat of resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable.	No species of high interest to the state have been identified on or near the Belle Ayr 2000 tract.	There are no unsuitable findings, and the Belle Ayr 2000 tract is not unsuitable for mining.
16. *Floodplains.* Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable unless stipulated methods of mining can be undertaken without substantial threat of loss of life or property.	After consultation with the USGS, it was determined that floodplains can be mined with site-specific stipulations and resource protection safeguards to be developed during mining and reclamation planning. Therefore, all lands within the review area are available for further consideration.	There are no unsuitable findings; the tract is available for further consideration.
17. *Municipal Watersheds.* Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.	There are no municipal watersheds within the review area.	There are no unsuitable findings; the tract is available for further consideration.
18. *National Resource Waters.* Federal lands with national resource waters, as identified by the states in their water quality management plans, and ¼-mile buffer zones shall be considered unsuitable.	There are no national resource waters within the review area.	There are no unsuitable findings; the tract is available for further consideration.
19. *Alluvial Valley Floors.* All lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue or preclude farming, are unsuitable. Additionally, when mining federal lands outside an AVF would damage the quality or quantity of water in surface or underground systems that would supply AVFs, the land shall be considered unsuitable.	Lands along prominent drainages were considered potential AVFs pending a final determination by the state. These lands are placed in an "available pending further study" category and are not considered unsuitable.	There are no prominent drainages or potential AVFs on the Belle Ayr 2000 tract and there are no unsuitability findings.
20. *State or Indian Tribe Criteria.* Federal lands to which is applicable a criterion proposed by the state or Indian tribe located in the planning area and adopted by rulemaking by the Secretary are unsuitable.	The state has no applicable criteria and there is no Indian tribe located in or near the planning area. Therefore, there is no unsuitability finding.	There are no unsuitability findings for this criterion on the LBA tract.

BLM 1985

federal coal were provided the opportunity to have their views considered by the BLM during land use planning. The surface on the Belle Ayr 2000Tract is owned entirely by RAG Wyoming Land Company, Inc.

As part of the coal planning for the Buffalo RMP, a multiple land use conflict analysis was completed to identify and "eliminate additional coal deposits from further consideration for leasing to protect resource values of a locally important or unique nature not included in the unsuitability criteria," in accordance with 43 CFR 3420.1-4e(3). The multiple use conflict evaluation in the Buffalo RMP identified approximately 221,000 acres within Campbell, Converse, and Johnson counties that were potentially affected by multiple use conflicts in four categories (producing oil and gas fields, communities, recreation and public purpose facilities, and cultural resources). None of the multiple use conflict areas identified in the Buffalo RMP are included in the Belle Ayr 2000 LBA Tract.

The 1985 Buffalo RMP addressed coal and oil and gas development conflicts in two planning decisions. Decision MM-4 recommended authorizing oil and gas drilling on coal leases only where drilling would not conflict with coal mining, and Decision MM-5 recommended deferring coal leasing in producing oil and gas fields until coal development would not interfere with economic recovery of the oil and gas resource, as determined on a case by case basis. There are no federal oil and gas leases and no producing oil and gas wells included in the Belle Ayr 2000 Tract.

The potential for conflicts between coal and CBM development was not specifically considered in the 1985 Buffalo RMP, but it was discussed in the 1997 report summarizing the results of the 1993 application of the coal screens in Campbell, Sheridan and Johnson counties. BLM is currently preparing an EIS which will be used to update the Buffalo RMP with respect to coal bed methane (CBM) development.

In summary, all of the lands in the Belle Ayr 2000 coal lease application have been subjected to the four coal planning screens and determined acceptable for further lease consideration. Thus, a decision to lease the federal coal lands in this application would be in conformance with the BLM Buffalo RMP.

1.6 RELATIONSHIP TO STATUTES, REGULATIONS, OR OTHER PLANS

In addition to the federal acts listed under Section 1.2, guidance and regulations for managing and administering public lands, including the federal coal lands in the Belle Ayr 2000 application, are set forth in 40 CFR 1500 (Protection of Environment), 43 CFR 1601 (Planning, Programming, Budgeting), and 43 CFR 3400 (Coal Management).

Specific guidance for processing applications follow BLM Manual 3420 (Competitive Coal Leasing, BLM 1989) and the 1991 Powder River Regional Coal Team Operational Guidelines For Coal Lease-By-Applications (BLM 1991). The National Environmental Policy Act Handbook (BLM 1988) has been followed in developing this EA.

28

1.7 CONSULTATION AND COORDINATION

BLM received an application for a maintenance LBA that encompassed the coal resources included in the Belle Ayr 2000 Tract as well as additional coal resources northwest of the Belle Ayr 2000 lease application area on March 20, 1997. This LBA application was reviewed by the RCT at their April 23, 1997 public meeting in Casper, Wyoming and at their October 27, 1999 public meeting in Gillette, Wyoming. The RCT recommended that the BLM process the Belle Ayr LBA application.

BLM filed a Notice of Scoping for the Belle Ayr LBA and Jacobs Ranch Coal Company's North Jacobs Ranch LBA in the *Federal Register* on October 7, 1999. A public scoping meeting was held for both applications at 7:00 p.m. on October 19, 1999 at the Best Western Tower West Lodge in Gillette, Wyoming. Six oral comments were received at the scoping meeting. The scoping period extended from October 1 through October 30, 1999, during which time BLM received nine written comments. The majority of both the oral and the written scoping comments were specifically related to the North Jacobs Ranch LBA, however, three of the letters that were received included general scoping comments pertaining to both the Belle Ayr and North Jacobs Ranch LBAs.

On July 28, 2000, RAG Wyoming Land Company, Inc. filed a request to modify the original Belle Ayr LBA to remove the Belle Ayr 2000 Tract. The remaining portion of the original Belle Ayr LBA is now referred to as the Belle Ayr 1997 Tract. A separate lease application for the Belle Ayr 2000 Tract was also submitted. The RCT reviewed the request to modify the original Belle Ayr LBA application and the request for Belle Ayr 2000 Tract application at their October 25, 2000 public meeting in Cheyenne, Wyoming, and recommended that the BLM process it.

Public scoping for the Belle Ayr 2000 application is took place during September, 2000. Four written scoping comments were received during that period.

This draft EA is being mailed to parties on the distribution list, and copies are being made available for review at the BLM offices in Casper and Cheyenne. The BLM will publish a Notice of Availability and Notice of Public Hearing in the *Federal Register*. A 30 day comment period will commence with the publication of the BLM Notice of Availability. A formal public hearing will be held.

All comments received on the draft EA will be included, with responses, in the final EA. Availability of the Final EA will be published in the *Federal Register*. After a 30-day availability period, BLM will make a decision to hold or not to hold a competitive lease sale and issue a lease for the federal coal in this tract. A public decision record will be mailed to parties on the mailing list and others who commented on this LBA during the NEPA process. The public and/or the applicant can appeal the BLM decision to hold or not to hold a competitive sale and issue a lease for the tract. The BLM decision must be appealed within 30 days after it is signed. The decision can be implemented at that time if no appeal is received. If a competitive lease sale is held, the lease sale will follow the procedures set forth in 43 CFR 3422, 43 CFR 3425, and BLM Handbook H-3420-1 (Competitive Coal Leasing).

Department of Justice Consultation

After the competitive coal lease sale, but prior to issuance of the lease, the BLM will solicit the opinion of the Department of Justice on whether the planned lease issuance creates a situation inconsistent with federal anti-trust laws. The Department of Justice is allowed 30 days to make this determination. If the Department of Justice has not responded in writing within the 30 days, the BLM can proceed with issuance of the lease.

2 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action and alternatives to this action. The Proposed Action is to hold a competitive lease sale and issue a lease for the federal coal lands included in the Belle Ayr 2000 Tract to the successful bidder. Under this alternative, it is assumed that the tract would be developed as a maintenance tract for an existing mine. The No Action alternative (Alternative 1) is to reject the Belle Ayr 2000 lease application. Under this alternative, the Belle Ayr 2000 Tract would not be offered for sale at this time. BLM also considered holding a competitive lease sale for a modified tract and delaying the sale of the tract.

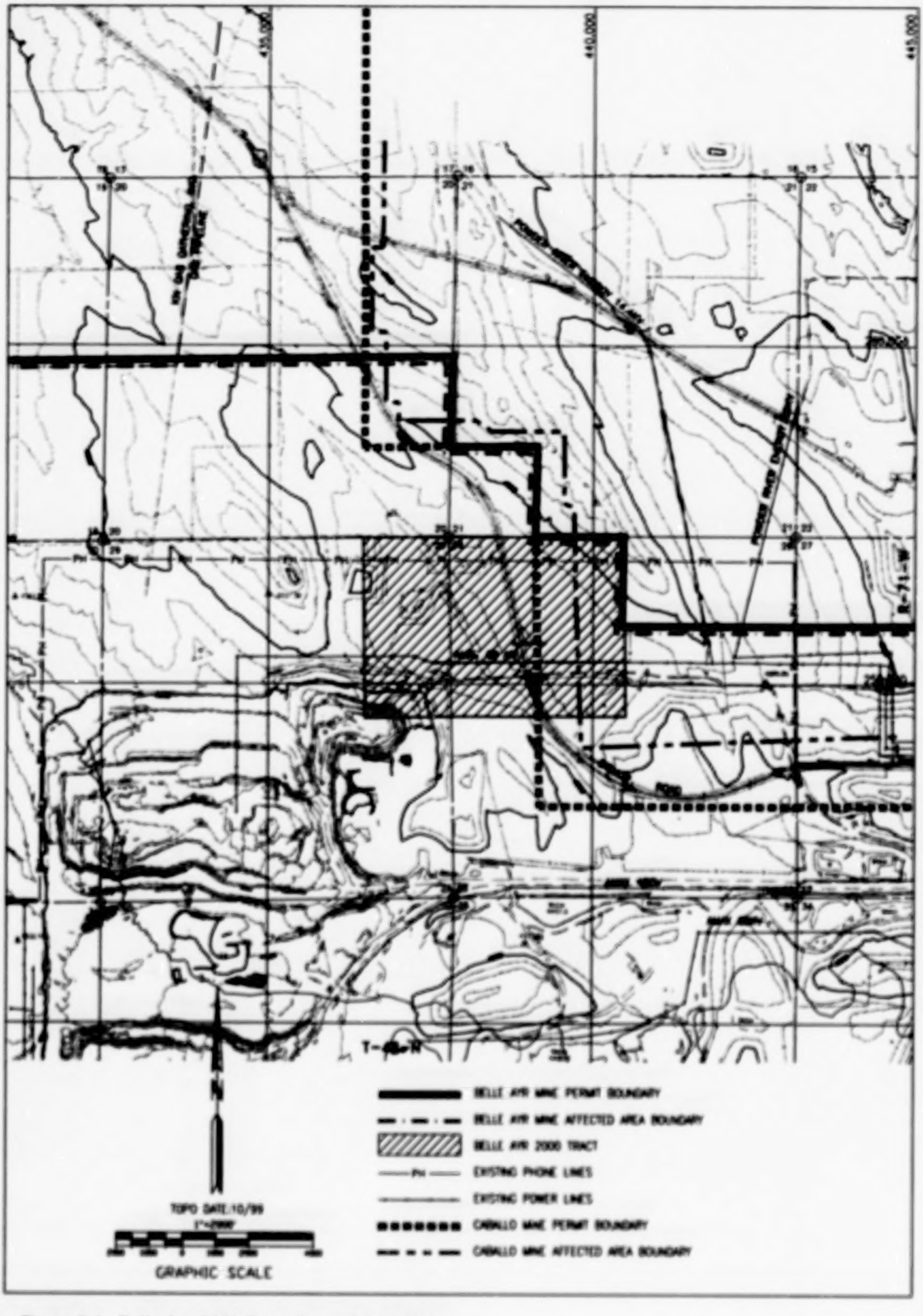
LBA tracts are nominated for leasing by companies with an interest in acquiring them, but as discussed in Chapter 1, the LBA process is, by law and regulation, an open, public, competitive sealed-bid process. If the decision reached after this EA is completed is to hold a lease sale, the applicant (RAG) may or may not be the high bidder. The Proposed Action in this EA assume that RAG would be the successful bidder if a competitive sale is held, and that the Belle Ayr 2000 Tract would be mined as a maintenance tract for the permitted Belle Ayr Mine.

The Belle Ayr 2000 Tract is also located adjacent to the Caballo Mine, operated by Powder River Coal Company. The Caballo Mine is also in a position to mine the Belle Ayr 2000 Tract as a maintenance lease. If Powder River Coal Company acquires the tract, the rate of coal production, mining sequence, equipment, and facilities would be different than if RAG acquired the tract as a maintenance lease. However, if the tract is mined as a maintenance lease for the Caballo Mine, the area of disturbance and the impacts of removing the coal would not be significantly different from the area of disturbance and the impacts of RAG mining the tract.

If a decision is made to hold a competitive lease sale, there is a successful bidder, and a lease is issued, a detailed mining and reclamation plan must be developed by the successful bidder and approved before mining can begin on the tract. As part of the approval process, the mining and reclamation plan would undergo detailed review by state and federal agencies. This plan could potentially differ from the plan used to analyze the impacts of the Proposed Action in this EA, but the differences would not be expected to significantly change the impacts described here. These differences would typically be related to the details of mining and reclaiming the tract but major factors like tons of coal mined, yards of overburden removed, acres disturbed, etc. would not be different from the plan used in this analysis.

2.1 PROPOSED ACTION

Under the Proposed Action, the Belle Ayr 2000 Tract, as applied for (Figure 2-1), would be offered for lease at a competitive sale, subject to standard and special lease stipulations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GRAPHIC SCALE
BELLE AYR MINE PERMIT BOUNDARY
BELLE AYR MINE AFFECTED AREA BOUNDARY
BELLE AYR 2000 TRACT
EXISTING PHONE LINES
EXISTING POWER LINES
CABALLO MINE PERMIT BOUNDARY
CABALLO MINE AFFECTED AREA BOUNDARY

Figure 2-1. Belle Ayr 2000 Tract General Area Map

32

developed for the Powder River Basin (Appendix B). This alternative assumes that RAG will be the successful bidder on the tract if it is offered for sale. The legal description of the tract as applied for is as follows:

T48N, R71W, 6th P.M., Campbell County, Wyoming

Section 28:	Lots 3 through 6
Section 29:	Lots 1, 6

The tract is approximately 243.61 acres in size and is located adjacent and north of the existing Belle Ayr Mine. Land description and acreage are based on approved U.S. Department of the Interior, Bureau of Land Management plats filed in Cheyenne, Wyoming.

RAG estimates that the Belle Ayr 2000 Tract contains approximately 29 million tons of recoverable coal. The acquisition of this lease would extend the life of the Belle Ayr Mine for less than three years. BLM will independently evaluate the volume and average quality of the coal resources included in the tract as part of the fair market determination process. BLM's estimate of the mineable reserves and average quality of the coal included in the tract will be published in the sale notice if the tract is offered for sale.

Under the Proposed Action the Belle Ayr 2000 Tract would be mined as part of an existing mine using existing equipment, facilities and personnel. RAG has requested timely processing of the Proposed Action because the active pit at the Belle Ayr Mine is currently adjacent to the Belle Ayr 2000 Tract. The current mining plan calls for backfilling adjacent to the Belle Ayr 2000 Tract until 2002, when mining would progress to the west and south. At that point, it would not be economically feasible for the Belle Ayr Mine to mine the proposed tract in the foreseeable future. If the lease is acquired by the applicant, mining would begin within months of the acquisition of the lease.

Belle Ayr mining operations are moving into areas with increasing overburden-to-coal stripping ratios, but the capacity to remove overburden is defined by the existing shovel and truck fleets. With this fixed overburden removal capacity, coal production at the Belle Ayr Mine will decline as the stripping ratio increases. In early November, 2000, RAG announced that it would be laying off 48 workers at the Belle Ayr and Eagle Butte Mines by the end of the year and cutting production by about 6 million tons, primarily at the Belle Ayr Mine, in 2001. If RAG acquires the Belle Ayr 2000 Tract, further declines in the coal production level could potentially be postponed because the coal-to-overburden stripping ratios are lower in the LBA tract than in the remaining leases at the Belle Ayr Mine.

The Belle Ayr Mine is operating under both an approved state mining permit and an MLA mining plan. The tract is located within the permit boundary and will be affected by currently permitted operations for the Belle Ayr Mine. Both the approved state mining permit and MLA mining plan would require amendment to include mining the Belle Ayr 2000 Tract. The permit boundary may need to be extended to allow overstrip activities outside the current Belle Ayr Mine permit boundary. The permit boundary for the Caballo Mine also includes part of the Belle Ayr 2000 Tract.

The approved state mining permits for the adjacent mines include monitoring and mitigation measures that are required by Wyoming State Law. If the Belle Ayr 2000 Tract is leased as a maintenance tract for an adjacent mine, these monitoring and mitigation measures would be included in the mine permit revision that must be approved before the LBA Tract could be mined. These monitoring and mitigation measures are considered to be part of the Proposed Action because they are regulatory requirements.

No major changes to the current Belle Ayr operation would be incurred with the Proposed Action, which would allow Belle Ayr to continue mining at the current production rate for two to three more years. Additionally, the Proposed Action would allow shorter haul distances and lower overburden ratios resulting in less blasting and less overburden handling while the Belle Ayr 2000 Tract is being mined.

If the Belle Ayr 2000 Tract is leased as applied for, Bishop Road would have to be relocated to allow mining of lands occupied by the road. Bishop Road has been realigned in the past to accommodate mining at Belle Ayr Mine and can be relocated again under existing agreements.

Hazardous Materials, Substances, Wastes and Solid Waste Handling

As stated earlier, if the lease is acquired as applied for, the tract would be mined using the existing equipment, personnel and facilities. Therefore, no new waste streams or hazardous materials uses are anticipated. Belle Ayr Mine has existing policies and procedures for complying with hazardous materials, hazardous substances and hazardous and solid waste rules and regulations including SARA Title III, CERCLA, RCRA, and WDEQ Solid and Hazardous Waste Division Rules and Regulations.

As required, Belle Ayr Mine maintains current Spill Response Plans, Spill Prevention Control and Countermeasure Plans, and Emergency Response Plans. All mining operations are also required to be in compliance with regulations promulgated under the Federal Water Pollution Control Act (Clean Water Act), Safe Drinking Water Act, Toxic Substances Control Act, Mine Safety and Health Act, and the Federal Clean Air Act. In addition, mining operations must comply with all attendant state rules and regulations relating to hazardous material reporting, transportation, management, and disposal.

Compliance with these rules is the current practice at the Belle Ayr Mine. Acquisition of the Belle Ayr 2000 Tract would not change these current practices nor the amount or type of any wastes generated or disposed of at the mine.

2.2 ALTERNATIVE 1 (NO ACTION)

Alternative 1 is the No Action Alternative. Under the No-Action Alternative, RAG's lease application would be rejected, and the Belle Ayr 2000 Tract would not be offered for competitive sale, and the coal contained within the tract would not be mined at this time. Portions of the LBA tract that are adjacent to existing leases at both the Belle Ayr and Caballo Mines will be disturbed under the current mining plans in order to recover the coal in the existing leases.

As discussed previously, coal production at the Belle Ayr Mine would be expected to decrease under the No Action Alternative because operations at the mine are moving into areas of increasing overburden thickness, and the capacity to remove overburden is limited by the capacity of the existing truck and shovel fleets. With this fixed overburden removal capacity, coal production at the Belle Ayr Mine would decline as the stripping ratio increases. Employment would remain stable or would decrease.

For purposes of this analysis, it is assumed that if the No Action Alternative is selected, the Belle Ayr 2000 Tract would not be mined in the foreseeable future. Selection of this alternative would not preclude leasing in the future. Making this assumption allows a comparison of the economic and environmental consequences of mining these lands versus not mining them.

If the No Action Alternative is selected, the assumption that the tract would not be mined in the foreseeable future may be valid. The tract is bordered by existing leases on three sides. If the tract is not leased before the coal in the adjacent leases has been mined, it might not be economically feasible for anyone to re-enter this small peninsula of remaining coal after both the Belle Ayr and Caballo Mines have mined and reclaimed their adjacent leases.

Under the No Action Alternative, overburden production volumes would be consistent with the Proposed Action, but coal production volumes would fall below 14.9 mmtpy because of the fixed capacity of production equipment at the mine and the thicker overburden overlying the coal in the existing leases. Under the No Action Alternative, dust emissions would be expected to be reduced due to lower production volumes. If production volumes decrease, the life expectancy of the Belle Ayr Mine would be lengthened as it would require additional time to mine the existing reserves at lower coal production levels with the existing production equipment.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

2.3.1 ALTERNATIVE 2

Under the second alternative, BLM would hold a competitive coal lease sale and issue a maintenance lease to the successful bidder for a tract configured differently from the application. BLM has evaluated adding coal to or subtracting coal from the tract to avoid bypassing coal or to improve potential maximum economic recovery and/or fair market value of the coal included in the tract.

The proposed lease is bounded to the south by lease WYW-0317682, currently being mined by Belle Ayr Mine. Private coal is located on the west boundary of the proposed lease, and the lease for the Caballo Mine, WYW-3397 is located immediately east of the Belle Ayr 2000 Tract (Figure 2-1). Therefore, the tract could not be extended to the east, west or south. RAG applied for the proposed tract because it is located within the permit boundary and affected area boundary of the existing Belle Ayr Mine, and can be mined within months of acquisition of the lease. Expanding the lease to the north would add lands that are outside the permit and affected area boundaries of the Belle Ayr Mine. The Belle Ayr 2000 Tract would be bypassed by mining operations at the Belle Ayr Mine before baseline environmental data and approval of an amendment to the existing mining permit could be obtained. The lands to the north of the Belle Ayr 2000 Tract are included in the pending Belle Ayr 1997 LBA Tract, applied for by RAG.

The Belle Ayr 2000 Tract is a relatively small lease with approximately 29 million tons of recoverable coal which would extend the life of the Belle Ayr Mine for less than three years. Further reduction in the size of the lease could potentially create a bypass situation and would not be expected to increase the fair market value of the tract.

As indicated above, BLM's evaluation of the area included in and adjacent to the Belle Ayr 2000 Tract did not identify lands that could reasonably be added to or subtracted from the tract as applied for in order to reduce the potential for bypassing coal or to enhance the fair market value, maximum economic recovery, or potential for competitive interest in the tract. Therefore, Alternative 2 is not analyzed in detail in this EA.

2.3.2 ALTERNATIVE 3

Under Altarnative 3, BLM would delay the competitive coal lease sale for the Belle Ayr 2000 Tract until coal prices in the Powder River Basin improve or until coal bed methane is recovered.

There are two major sources of revenue to state and federal governments from the leasing and mining of federal coal. The first is the competitive bonus bid paid at the time the coal is leased. If selection of this alternative would increase the fair market value of the coal resources in the tract, it could increase the bonus bid when the coal is leased. However, this alternative would not be expected to increase the fair market value of the coal resources in the LBA tract. As stated earlier, both the Belle Ayr and Caballo mines have leases adjacent to the Belle Ayr 2000 Tract. This creates the potential for competitive interest in the tract, which could enhance the fair market value of the tract. The Belle Ayr Mine operation is currently active adjacent to the Belle Ayr 2000 Tract. If the sale of the tract proceeds and Belle Ayr is the successful lessee, they plan to enter the Belle Ayr 2000 Tract by the end of 2001, before the active pit turns west. If Belle Ayr does not acquire the tract in time to permit it before the active pit turns west, the costs for Belle Ayr to return and reenter the area would be prohibitive in the foreseeable future. Once that happens, the potential for competitive interest in the tract would no longer exist, which would be expected to reduce the fair market value of the tract.

The second major source of revenue to state and federal governments from the leasing and mining of federal coal is a 12.5 percent royalty collected when the coal is sold. If coal prices rise, royalty income would increase automatically because it is collected when the coal is sold.

There are no federal oil and gas leases included in the Belle Ayr 2000 Tract. The Wyoming Oil and Gas Conservation Commission has approved drilling permits for 4 coal bed methane (CBM) wells on the Belle Ayr 2000 Tract (Table 2-1), but none of these wells have been drilled, and no pipelines are available in the immediate area. By the time that coal bed methane wells could be drilled, pipelines could be extended, and coal bed methane resource could be developed, the coal resource would be mined by RAG or operations at the Belle Ayr Mine would have bypassed the tract. Also, the Belle Ayr 2000 Tract is adjacent to currently active mining operations at the Belle Ayr Mine. If the CBM gas content in the coal has declined due to the proximity to active mining operations, the wells might not be economic to produce at this time.

This alternative is not analyzed in detail in this EA because delaying the sale of the lease would be expected to decrease the competitive value of the tract, and the economic potential of the CBM resources on the tract are limited due to the proximity of the tract to active mining operations.

2.4 COMPARISON OF ALTERNATIVES

The Proposed Action and No Action Alternatives are analyzed in detail in this EA. A summary comparison of coal production, surface disturbance, mine life, and projected federal and state revenues for the Proposed Action and Alternatives 1 and 2 for the Belle Ayr 2000 Tract is presented in Table 2-2.

37

Table 2-1
Wyoming Oil and Gas Conservation Commission
Oil and Gas Well Permits Within the Belle Ayr 2000 Tract

Api Number	Permit No.	Unit or Lease Name	Qtr Qtr	Sec	T	R	Company	Well Class	Status
524146	24146	Clabaugh	NWNW	28	48N	71W	Smith Al	O	PA
529500	29500	Meadowlark Farms	SWNW	28	48N	71W	Equitable Resources Energy Company	O	ND
536506	36506	RAG	SENW	28	48N	71W	Hi-Pro Production	G	SP
536505	36505	RAG	NENW	28	48N	71W	Hi-Pro Production	G	SP
536504	36504	RAG	SWNW	28	48N	71W	Hi-Pro Production	G	SP
536503	36503	RAG	NWNW	28	48N	71W	Hi-Pro Production	G	SP

Codes

O	Oil Well
G	Gas Well
PA	Permanently Abandoned
ND	Not Drilled
SP	Well Spudded

Table 2-2
Comparison of Coal Production, Surface Disturbance, and Mine Life for Belle Ayr Mine and Belle Ayr 2000 Tract LBA

Item	No Action Alternative (Existing Belle Ayr Mine)	Added by Proposed Action
Recoverable Coal[1] (as of January 1, 2000)	326.2 million tons	29 million tons
Coal Mined Through 1999	379.4 million tons	--
Federal Lease Acres[2]	4,983.55 acres	243.61 acres
Total Area To Be Disturbed[2]	8,441 acres	118 acres[5]
Permit Area[2]	11,935.63 acres	0 acres[6]
Remaining Life Of Mine (post-1999)	24 years	2-3 years
Average No. of Employees[7]	236	0
Total Projected State Revenues (post-1999)[3]	$358.8 million	$31.9 million
Total Projected Federal Revenues (post-1999)[4]	$142.7 million	$15.9 million

[1] Assumes 94 percent recovery of federal and fee coal reserve base within the Belle Ayr Logical Mining Unit (LOGICAL MINING UNIT).

[2] For the Proposed Action the disturbed acreage exceeds the leased acreage because of the need for highwall reduction, topsoil removal and other activities outside the lease boundaries. The permit area is larger than leased or disturbed areas to assure that all disturbed lands are within the permit boundary and to allow easily defined legal land description.

[3] Projected revenue to State of Wyoming is $1.10 per ton of coal sold and includes income from severance tax, property and production taxes, sales and use taxes, and Wyoming's share of federal royalty payments (University of Wyoming 1994).

[4] Federal revenues based on $3.50/ton price x federal royalty of 12.5 percent x amount of recoverable coal plus bonus payment on LBA coal of 22¢/ton based on average of last ten LBA's (see Table 1-1) x amount of leased coal less state's 50 percent share.

[5] The 118 acres represent net acres of disturbance in addition to currently approved mining operations at the Belle Ayr and Caballo Mines.

[6] All of the acres for the Proposed Action are contained within either the Belle Ayr Mine or the Caballo Mine permit areas.

[7] Number of employees as of August 1, 2000. RAG recently announced that it plans to lay off 48 workers at the Belle Ayr and Eagle Butte Mines by the end of 2000. No new employment is anticipated under the Proposed Action.

3 THE AFFECTED ENVIRONMENT

This chapter describes the existing conditions of the physical, biological, cultural, and socioeconomic resources in the study area. The resources that are addressed here were identified during the scoping process or interdisciplinary team review as having the potential to be affected.

Critical elements of the human environment (BLM 1988, 1999) that could potentially be affected by the Proposed Action include air quality, cultural resources, Native American religious concerns, threatened or endangered species, hazardous or solid wastes, water quality, wetlands/riparian zones, invasive, nonnative species (noxious weeds), and environmental justice. Five other critical elements (areas of critical environmental concern, prime and unique farmland, floodplains, wild and scenic rivers, and wilderness) are not present in the project area and are not addressed further. In addition to the critical elements that are potentially present in the project area, this EA discusses the status and potential effects of mining the proposed Belle Ayr 2000 Tract on topography and physiography, geology and minerals, geologic hazards, water quantity, alluvial valley floors, soils, vegetation, wildlife, paleontological resources, visual resources, soils, land use and recreation, and socioeconomics.

Detailed environmental information has been collected on the Belle Ayr 2000 Tract because it is overlapped by the mining permit boundaries of the adjacent Belle Ayr and Caballo Mines. This chapter summarizes information from the current approved Belle Ayr WDEQ/ LQD Permit to Mine (#214-T5). The current approved Caballo WDEQ/LQD Permit to Mine also includes information on portions of the tract. The permit documents for these two mines contain more detailed information. Copies of these public documents are available at the Sheridan and Cheyenne WDEQ/LQD offices, and the Casper OSM office..

3.1 GENERAL SETTING

The Powder River Basin is an elongated, asymmetrical structural downfold. The Belle Ayr Mine is located on the eastern flank of the Powder River Basin, and is characterized by rolling hills covered with grass and sagebrush. To the east, the topography changes abruptly to rough, broken, scoria-capped hills. Numerous scoria or sandstone-capped buttes extend to the west. The major drainage in the immediate area is Caballo Creek, which flows west to east through the Belle Ayr Mine permit area, south of the Belle Ayr 2000 Tract. Bone Pile Creek, Duck Nest Creek, and Tisdale Creek are tributaries to Caballo Creek from the north while Clabaugh, DeMott, Royal, Les, and Belle Ayr Draws are the main tributaries to Caballo Creek from the south within the permit area. Maximum local relief within the permit area is 271 feet with the elevation ranging from 4432 to 4703 feet.

3.2 TOPOGRAPHY AND PHYSIOGRAPHY

The topography of the Belle Ayr 2000 Tract is similar to the balance of the Belle Ayr permit area. The area east of Bishop Road is located in a non-contributing basin that slopes gently to the southeast toward a playa that is intersected by Bishop Road. The area west of Bishop Road slopes toward Draw No. 2, an ephemeral tributary of Caballo Creek, which flows to the south.

3.3 GEOLOGY

The Belle Ayr Mine is located on the eastern flank of the Powder River Basin. The structure of the geologic strata within the permit area is homoclinal with beds dipping one to two degrees to the west.

Surface geology in the area of the Belle Ayr 2000 Tract is dominated by the Wasatch formation that is composed of fluvial and paludal sediments. This formation is of Upper Eocene Age and is composed of interbedded and highly lenticular variegated clays, shales, sandstones, occasional fresh water limestones, and thin coal seams. Correlation of individual strata is difficult due to the discontinuous and lens-like nature of the units which is inherent in fluvial deposition, e.g., channel sand deposits. The overburden shales are predominantly silty shales, with lesser thicknesses of clay shales and sandy shales. The degree of lithification of the Wasatch Formation is quite variable, ranging from virtually uncemented sands to moderately well cemented siltstones and sands and from soft to very stiff clays and silty clays.

The target coal bed of the Belle Ayr 2000 Tract is referred to as the Wyodak or Wyodak-Anderson seam. The coal is sub-bituminous and averages 72 feet in thickness in the permit area. There are no partings in the coal on the tract.

The stratum immediately underlying the coal is generally a black carbonaceous claystone with coaly inclusions. Root structure is commonly observed within this claystone. Poorly consolidated sandstone locally underlies the coal.

Additional information regarding the geology of the Belle Ayr 2000 Tract and the Belle Ayr Mine permit area, including maps and cross-sections can be found in Section 2.5 of the WDEQ/LQD Permit to Mine #214.

3.4 SOILS

The soils on the Belle Ayr 2000 Tract are typical of the soils that occur on the remainder of the Belle Ayr Mine permit area, and are similar to soils currently being salvaged by Belle Ayr and Caballo Mines and other Powder River Basin mines. The Belle Ayr 2000 Tract is expected to have an adequate quantity and quality of soil for reclamation as is currently being accomplished at the Belle Ayr Mine. A summary of soil series that comprise the map

41

units on the Belle Ayr 2000 Tract, along with typical topsoil stripping depths is included as Table 3-1.

All soil surveys were completed in accordance with WDEQ/LQD Guideline No. 1 which outlines required soils information necessary for a coal mining operation. The inventories included field sampling and observations at the requisite number of individual sites, and laboratory analysis of representative collected samples.

Data in the area of the Belle Ayr 2000 Tract was collected by Belle Ayr primarily between 1973 and 1982. The survey methods, mapping, sampling techniques, and results are presented in Appendices 2.7-1, 2.7-2, and 2.7-3 of the WDEQ,/LQD Permit to Mine #214-T5. Soil series are illustrated on Map 2.7-1 of the permit.

Table 3-1
Belle Ayr 2000 Tract
Soils Description

Series Name	Topsoil Stripping Depth (Inches)	Hydraulic Curve No.
Maysdorf	42	69
Bidman	30-36	79
Pugsley	24	79
Briggsdale	30	79
Samsil	4-6	84
Worf	12	84
Thedalund	18-24	79
Maysdorf-Pugsley Complex (70%/30)	42/24-37	69-79
Bidman-Briggsdale Complex (55%/45%)	30-33	79
Olney-Bowbac Complex (60%/40%)	30-37	69-84
Decolney-Olney Complex 60%/40%	30-35	69
Olney-Vona Complex (60%/40%)	30-37	69

3.5 AIR QUALITY

The basic regulatory framework governing air quality in Wyoming is the Wyoming Environmental Quality Act, the accompanying Air Quality Standards and Regulations promulgated by the Environmental Quality Council, and the State Implementation Plan approved by the EPA under the Clean Air Act. This regulatory framework includes state air quality standards, which must be at least as stringent as National Ambient Air quality Standards, and allowable increments for the prevention of significant deterioration of air quality.

The prevention of significant deterioration (PSD) program is designed to protect air quality from significant deterioration in areas already meeting state standards. In other words, an increase in ambient air pollutant concentrations, above the area baseline, is allowable if the state standard increment for the pollutant is not exceeded for the area. The increment allowable under PSD depends on the area's designation as Class I, II, or III. Class I areas are allowed the smallest increment and Class III the largest. The area the coal mines are located in is Class II, as is all of Wyoming outside the national parks and wilderness areas. The Class I area that is closest to the Belle Ayr 2000 Tract is Wind Cave National Park in South Dakota, approximately 100 miles to the southeast.

In the vicinity of the Belle Ayr 2000 Tract, the main sources of air pollution are surface coal mines, vehicle traffic, various sources associated with oil and gas production, railroad traffic, and farming and ranching activities. The closest operating power plants are approximately 13 miles north of the tract near Gillette.

The major type of emissions from surface coal mining activities is fugitive dust. Blasting and moving overburden, crushing, loading, and hauling coal, and the large areas of disturbed land all produce dust. Wyoming has PM_{10} ambient air standards for particulates. PM_{10} is respirable particulate matter (less than 10 microns) which can penetrate into the lungs and cause health problems.

Blasting is also responsible for another type of emission from surface coal mining. Overburden blasting sometimes produces low-lying gaseous orange clouds which contain NO_x.

Vehicle traffic, both inside and outside the areas of surface coal mining, is responsible for tailpipe emissions and for the emission of fugitive dust from paved and unpaved surfaces. Vehicle emissions consist primarily of nitrogen oxides (NO_x) and carbon monoxide (CO) and may include sulfur dioxide (SO_2) and, by secondary processes, ozone(O_3). The national and state standards for emissions of these substances are also shown in Tables 3-2 and 3-3.

43

The compressor stations and large generators associated with oil and gas production and transport, and fossil fuel-fired power plants produce emissions of NO_x, SO_2, CO, total suspended particulates (TSP), PM_{10}, volatile organic compounds, and smaller amounts of other pollutants.

The main pollutant of concern associated with the locomotive for the trains used to haul coal and other commodities is NO_x. The main pollutants produced by farming and ranching activities are dust and NO_x.

Table 3-2
Regulated Air Emissions for Selected Ambient Air Quality Standards

Emissions	Averaging Period	Wyoming Standard ($\mu g/m^3$)	National Standard ($\mu g/m^3$)
PM_{10} Particulate Matter	24-hour[1]	150	150
	annual[2]	50	50
Nitrogen Oxide (NO_x)	annual[2]	100	100
Photochemical Oxidant (O_3)	1-hour[1]	--	235
Sulfur Dioxide (SO_2)	3-hour[1]	1,300	---
	24-hour[1]	260	365
	annual[2]	60	80
Carbon Monoxide (CO)	1-hour[1]	40,000	40,000
	8-hour[1]	10,000	10,000

[1] Standards not to be exceeded more than once per year.

[2] Annual arithmetic mean not to be exceeded.

In order to obtain a state air quality construction and operating permit, each mine may be required to demonstrate, through dispersion modeling, that its activities will not increase PM_{10} levels above the annual standard established by the Wyoming Air Quality Standards and Regulations (WDEQ/AQD 1995). The modeling demonstration must include the estimated air pollutant emissions from other existing pollution-generating activities, including adjacent mines, so that control of overall air quality is part of the permitting process.

Table 3-3
Maximum Allowable Increases for Prevention of Significant Deterioration of Air Quality: Particulates

Emission	Averaging Time	Maximum Allowable Increments of Deterioration ($\mu g/m^3$) Class I	Class II	Class III[2]
PM_{10}	Annual Mean	4	17	--
	24-hour[1]	8	30	--

[1] Maximum allowable increment may be exceeded once per year at any receptor site.

[2] Wyoming has not adopted Class III standards.

3.6 WATER RESOURCES

3.6.1 GROUNDWATER

Four types of aquifers exist in the Belle Ayr Mine permit area: scoria, coal beds, Caballo Creek alluvium, and sand bodies within the Wasatch formation. These water-bearing units comprise the shallow groundwater system in the mine area. Deeper sandstone aquifers occur in the Fort Union, Lance, and Fox Hills formations. The Caballo Creek alluvium and the scoria aquifer do not extend onto the Belle Ayr 2000 Tract and are not discussed at length in this EA.

Groundwater resources within the various aquifers occur under a wide range of hydrologic conditions from perched or semi-perched to confined. Groundwater movement is primarily downward, except in limited areas where the coal is in contact with scoria or Caballo Creek alluvium. In those areas, potentiometric surfaces in the coal indicate upward recharge.

A detailed study of the groundwater resources at the Belle Ayr Mine, including maps and cross-sections, is presented in Section 2.6.2 of the WDEQ/LQD Permit #214. Results of the detailed study are summarized below to present general aquifer characteristics underlying the Belle Ayr 2000 Tract.

Coal Aquifer

Due to its continuity, the Wyodak Coal seam is considered a regional aquifer within the Powder River Basin. Studies completed at the Belle Ayr Mine, Caballo Mine and nearby Caballo Rojo Mine indicated an average transmissivity value of 750 gpd/ft with a storage coefficient of 0.003.

Primary recharge to the coal occurs along the coal along its contact with the scoria while secondary (vertical) recharge occurs throughout the area. The coal seams and deeper Fort Union sediments are generally recharged by surface infiltration and water moving downward from overlying Wasatch aquifers. Surface infiltration and direct recharge to the coal from overlying Wasatch overburden is probably minimal in the mine area; the potentiometric surface in the overburden is considerably higher than that in the coal along the T-7 Road. Static water levels are several tens of feet above the top coal structure, indicating the coal aquifer is confined by overlying claystones and siltstones.

Overburden Aquifers

The siltstones, claystones, and shales of the Wasatch overburden are very poor aquifers, ranging from aquitards to aquicludes. There is an anastomosing ("braided" stream) sandy overburden aquifer in the central and western portions of the Belle Ayr Mine permit area.

Wasatch overburden sand bodies constitute minor aquifers of interest in this area. Recharge to these sandstone units occurs both by direct surface infiltration and by recharge near the outcrop area and subsequent down gradient movement of groundwater.

Much of the Belle Ayr Mine Wasatch Formation overburden is composed of silty and clayey shales. Observations of the highwall and drill holes indicate that this material often does not transmit appreciable water when the material is massive and intact. However, small sand lenses or fractures in the shales will transmit water.

Fort Union Formation Aquifers

Mining activities will not directly disturb the Fort Union and Lance-Fox Hills formations underlying the coal, but some mines use them for water supply wells.

Groundwater occurs in the sand lenses of the Fort Union formation. The best Fort Union aquifers, in which many wells in the vicinity of the Belle Ayr Mine are completed, range from 800 to 1200 feet below the ground surface. The Plant #2 well, located in sand lenses of the Fort Union formation, has been used to monitor aquifer properties and the groundwater elevations. The transmissivity in the Plant #2 well was calculated to be 406 gpd/ft and the storage coefficient 0.21. The static water level in the well was 205 feet below the ground surface at elevation 4285 feet.

Lance-Fox Hills Formation Aquifer

Belle Ayr No. 3 and 4 wells are completed in the Lance and Fox Hills formations and are used to monitor these formations. The initial static water level of Belle Ayr No. 3 was 70 feet below ground surface. The initial pumping water level was 212 feet. The initial level of Belle Ayr No. 4 was 752 feet. Belle Ayr No. 3 well is currently being plugged and abandoned.

3.6.2 SURFACE WATER

The Belle Ayr 2000 Tract lies entirely within the Caballo Creek watershed. Caballo Creek flows from west to east through the permit area and empties into the Belle Fourche River approximately five miles downstream of the Belle Ayr eastern permit boundary. The total drainage area of Caballo Creek is approximately 260 square miles.

For permitting purposes, a detailed study of the premine drainage characteristics was completed for the Belle Ayr Mine, including the Belle Ayr 2000 Tract. This study can be reviewed in its entirety in the WDEQ/LQD Permit #214. Information from that study relative to the Belle Ayr 2000 Tract is summarized in this section.

Draw No. 2, a tributary of Caballo Creek, intersects the Belle Ayr 2000 Tract in a north-south direction and flows to the south. Draw No. 2 is a swale-bottomed drainage and is ephemeral in nature. It only flows in response to precipitation and major snowmelt events.

Water quality in Caballo Creek is generally poor when compared to recommended limits for drinking water and standards for irrigation waters. The surface water is alkaline in nature with pH values ranging from 7.0 to 8.98. Total iron generally runs about 1.0 mg/l at most quality check stations. Total suspended solids (TSS) is generally less than 30 mg/l in undisturbed stretches of Caballo Creek.

Total dissolved solids (TDS)in Caballo Creek is high. Values of TDS decrease during higher flow periods because increased quantities of fresh water dilute the higher salt concentration of lower flows.

A large playa, identified as Playa 11 by Belle Ayr Mine, is partially located on the Belle Ayr 2000 Tract. Playa 11 is approximately 34.37 acres in size and has a capacity of 107.25 acre-feet with a maximum depth of 5.3 feet. Bishop Road intersects the playa. This playa does not meet the requirements to be classified as a jurisdictional wetland.

3.6.3 WATER RIGHTS

Water rights for the entire Belle Ayr Mine are discussed in detail in Section 1.9 of the WDEQ/LQD Permit to Mine #214. A list of current groundwater rights and surface water rights for the Belle Ayr 2000 Tract and all of Sections 28 and 29 was obtained from the Wyoming State Engineer's office. Current groundwater rights are listed in Table 3-4 and surface water rights are listed in Table 3-5.

TABLE 3-4
Wyoming State Engineer's Office
Groundwater Rights
Sections 28 and 29, T48N, R71W

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Applicant	Facility Name	Use	Yield Act	Well Depth	Static Depth	Log
P32015W	10/30/75	48	71	28	NWNE	Carter Oil Company	Caballo OW-2	MON, MIS	0	325	190	Yes
P119803W	10/7/99	48	71	28	NENW	Hi-Pro Production, L.L.C.	R.A.G. 28-21	CBM				
P119801W	10/7/99	48	71	28	NWNW	Hi-Pro Production, L.L.C.	R.A.G. 28-11	CBM				
P30024W	5/30/75	48	71	28	NWNW	Amax Land Company	N 11	MON, MIS	0	207	85	No
P119802W	10/7/99	48	71	28	SWNW	Hi-Pro Production, L.L.C.	R.A.G. 28-12	CBM				
P119804W	10/7/99	48	71	28	SENW	Hi-Pro Production, L.L.C.	R.A.G. 28-22	CBM				
P69372W	2/11/85	48	71	28	NESW	Amax Coal Company	RW2803	MON, MIS	0	250.6	132.7	Yes
P55985W	2/26/81	48	71	28	NESE	Amax Land Company	RW 2801	MON, MIS	0	190	Unk	Yes
P5511P	4/13/51	48	71	28	NWSE	Amax Land Company	Earl #2	STO	5	130	40	Yes
P73594W	11/3/86	48	71	28	SESE	Amax Coal Company	RW2804	MON, MIS	0	117.5	Unk	Yes
P112880W	11/13/98	48	71	29	NENE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW35	MON	0	256	116.2	Yes
P112881W	11/13/98	48	71	29	NENE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW36	MON	0	250	168.4	Yes
P112896W	11/13/98	48	71	29	NENE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW51	MON	0	Unk	Unk	Yes
P112897W	11/13/98	48	71	29	NENE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW52	MON	0	242	163.7	Yes
P122121W	1/21/00	48	71	29	NENE	Belle Ayr Mine RAG Coal West, Inc.	P571375	MON				
P122122W	1/21/00	48	71	29	NENE	Belle Ayr Mine RAG Coal West, Inc.	P571372	MON				
P122123W	1/21/00	48	71	29	NENE	Belle Ayr Mine RAG Coal West, Inc.	P571369	MON				
P122124W	1/21/00	48	71	29	NENE	Belle Ayr Mine RAG Coal West, Inc.	P568375	MON				
P122125W	1/21/00	48	71	29	NENE	Belle Ayr Mine RAG Coal West, Inc.	P568372	MON				
P122126W	1/21/00	48	71	29	NENE	Belle Ayr Mine RAG Coal West, Inc.	P568369	MON				
P5510P	12/31/20	48	71	29	NENE	Amax Land Company	Earl #1	STO	4	65	35	Yes
P112878W	11/13/98	48	71	29	NWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW33	MON	0	0	0	No
P112879W	11/13/98	48	71	29	NWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW34	MON	0	0	0	No
P112892W	11/13/98	48	71	29	NWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW47	MON	0	388	234.1	Yes
P112893W	11/13/98	48	71	29	NWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW48	MON	0	0	0	No
P112894W	11/13/98	48	71	29	NWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW49	MON	0	0	0	No
P112895W	11/13/98	48	71	29	NWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW50	MON	0	0	0	No
P112866W	11/13/98	48	71	29	SWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW21	MON	0	308	176.9	Yes
P112867W	11/13/98	48	71	29	SWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW22	MON	0	0	0	No
P112870W	11/13/98	48	71	29	SWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW25	MON	0	344	180.7	Yes
P112871W	11/13/98	48	71	29	SWNE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW26	MON	0	0	0	No
P112868W	11/13/98	48	71	29	SENE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW23	MON	0	0	0	No
P112869W	11/13/98	48	71	29	SENE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW24	MON	0	231	149.4	Yes
P112872W	11/13/98	48	71	29	SENE	Amax Coal West, Inc./Belle Ayr Mine	A1-DW27	MON	0	0	0	No
P112876W	11/13/98	48	71	29	NENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW31	MON	0	365	176.6	Yes

48

TABLE 3-4
Wyoming State Engineer's Office
Groundwater Rights
Sections 28 and 29, T48N, R71W

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Applicant	[illegible] Name	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
P112877W	11/13/98	48	71	29	NENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW32	MON	0	340	184	Yes
P112888W	11/13/98	48	71	29	NENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW43	MON	0	334	179.1	Yes
P112889W	11/13/98	48	71	29	NENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW44	MON	0	349	206	Yes
P112890W	11/13/98	48	71	29	NENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW45	MON	0	352	220.2	Yes
P112891W	11/13/98	48	71	29	NENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW46	MON	0	0	0	No
P124028W	1/19/00	48	71	29	NENW	Belle Ayr Mine RAG Coal West, Inc.	A1-DW31	MIS, DEW				
P112874W	11/13/98	48	71	29	NWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW29	MON	0	325	192.4	Yes
P112875W	11/13/98	48	71	29	NWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW30	MON	0	343	179.8	Yes
P112884W	11/13/98	48	71	29	NWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW39	MON	0	0	0	No
P112885W	11/13/98	48	71	29	NWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW40	MON	0	351	217.4	Yes
P112886W	11/13/98	48	71	29	NWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW41	MON	0	365	218.2	Yes
P112887W	11/13/98	48	71	29	NWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW42	MON	0	338	201.9	Yes
P108119W	11/18/97	48	71	29	SWNW	Amax Coal West, Inc.	A335	MON, MIS	0	175	106.3	Yes
P112216W	10/7/98	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW04	MON				
P112217W	10/7/98	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW05	MON				
P112218W	10/7/98	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW06	MON	0	296	173.4	Yes
P112219W	10/7/98	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW07	MON				
P112220W	10/7/98	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW08	MON				
P112221W	10/7/98	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW09	MON				
P112862W	11/13/98	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW17	MON	0	0	0	No
P112863W	11/13/98	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW17	MON	0	323	164	Yes
P114848W	4/1/99	48	71	29	SWNW	Amax Coal West, Inc./Belle Ayr Mine	A335-CI	MON				
P108120W	11/18/97	48	71	29	SENW	Amax Coal West, Inc.	A3372c	MON, MIS	0	330	262.9	Yes
P109910W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-1	MON	0	206	118.9	Yes
P109911W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-2	MON	0	201	130.8	Yes
P109912W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	[illegible]	MON	0	207	124.9	Yes
P109913W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	[illegible]	MON	0	48	114	Yes
P109914W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-6	MON	0	150	110.8	Yes
P109915W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-6A	MON	0	206	113.1	Yes
P109916W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-7	MON	0	133	123.9	Yes
P109917W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-7A	MON	0	193	128.3	Yes
P109918W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-8	MON	0	216	116.7	Yes
P109919W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-9	MON	0	192	121.2	Yes
P109920W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-10	MON	0	213	112.7	Yes
P109921W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-11	MON	0	140	116.3	Yes
P109922W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-12	MON	0	141	112.8	Yes
P109923W	5/4/98	48	71	29	SENW	Amax Coal West, Inc.	A337-13	MON	0	320	136.1	Yes
P112222W	10/7/98	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW10	MON	0	295	148.6	Yes
P112223W	10/7/98	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW11	MON				

49

TABLE 3-4
Wyoming State Engineer's Office
Groundwater Rights
Sections 28 and 29, T48N, R71W

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
P112224W	10/7/98	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW12	MON	0	300	144.6	Yes
P112225W	10/7/98	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW13	MON				
P112226W	10/7/98	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW14	MON				
P112227W	10/7/98	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW15	MON	0	306	219.5	Yes
P112864W	11/13/98	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW19	MON	0	313	148	Yes
P112865W	11/13/98	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A1-DW20	MON	0	0	0	No
P114849W	4/1/99	48	71	29	SENW	Amax Coal West, Inc./Belle Ayr Mine	A336-CI	MON				
P116282W	5/25/99	48	71	29	SENW	Amax Coal West, Inc.	A3372C-1	MON				
P107948W	11/5/97	48	71	29	NWSW	Amax Coal West, Inc.	A259N	MON	0	117	43.3	Yes
P105930W	5/1/97	48	71	29	SWSW	Amax Coal West, Inc./Belle Ayr Mine	DW 2914	DEW, MIS	50	131	35	Yes
P23439P	7/26/73	48	71	29	SWSW	Amax Land Company	Dunlap #5	STO	25	120	Unk	No
P55446W	7/31/80	48	71	29	SESE	Amax Land Company	Enl Belle Ayr South Pit	DEW, MIS	424	150	80	No

Note: The above table was generated from SEO computer records which have not been updated to reflect permit transfers from AMAX to RAG.

Of the 87 groundwater rights listed in Sections 28 and 29, 83 are associated with mining. The other four groundwater rights are held by Hi-Pro Production, LLC for CBM wells. These CBM wells have not been drilled and would not be drilled under the Proposed Action. Groundwater rights within three miles of the permit boundary were researched in 1998 for WDEQ/LQD permitting purposes and are listed in WDEQ/LQD Permit #214.

The only surface water rights for the Belle Ayr 2000 Tract are held by RAG Coal West, Inc., and are for mining purposes. An additional search of surface water rights within three miles downstream of the Belle Ayr Mine was conducted for the WDEQ/LQD permit in 1998. No downstream surface water rights are held on Caballo Creek within three miles downstream of the Belle Ayr Mine.

3.7 ALLUVIAL VALLEY FLOORS

Alluvial valley floors (AVFs) are unconsolidated stream-laid deposits where water availability is sufficient for subirrigation or flood irrigation agriculture. Prior to leasing and mining, AVFs must be identified because SMCRA restricts mining activities which affect AVFs that are determined to be significant to agriculture. The presence of an AVF can only be substantiated following a detailed evaluation of the area using procedures specified in Chaptur 3, Section 2 of the WDEQ/LQD *Coal Rules and Regulations* and *Guideline No. 9* (WDEQ/LQD 1998; 1994). These procedures require an identification of the essential hydrologic functions of an area's mining operations. If an AVF is present, WDEQ/LQD must

50

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Table 3-5
Wyoming State Engineer's Office
Surface Water Rights
Sections 28 and 29, T48N, R71W

Permit No.	T	R	Sec	Qtr	Status	Supply	Use	Facility	Applicant	Source	Priority	Use Amt	Use Unit
P10812R	48	71	28	NENW	UNA	ORI	IND		Caballo Coal Company	Drainage Of Draw No. 2	06/25/1999		
P9143R	48	71	28	SWSW	PU	ORI	TEM,IND,MIS	Banpdes 015	Amax Coal Company	Drainage Of Donkey Creek	05/30/1985	152.14	ACFT
P9521R	48	71	28	SWSW	UNA	ORI	IND,FLO,REC, STO,FIS,WIL,TEM	Temporary North Pit Res	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	07/10/1989	617.8	ACFT
P9681R	48	71	28	SWSW	UNA	ORI	IND	Enl. Temporary North Pit	Amax Coal Co.	Horse Creek/Caballo (Cavajo) Creek	06/05/1990	999.21	ACFT
P9143R	48	71	28	SESW	PU	ORI	TEM,IND,MIS	Banpdes 015	Amax Coal Company	Drainage Of Donkey Creek	05/30/1985	152.14	ACFT
P10813R	48	71	28	NESE	UNA	ORI	IND	Lynx	Caballo Coal Company	Mcclure Draw	06/25/1999		
P10814R	48	71	28	NESE	UNA	ORI	IND	Ocelot	Caballo Coal Company	Hutz Draw	06/25/1999		
P10813R	48	71	28	NWSE	UNA	ORI	IND	Lynx	Caballo Coal Company	Mcclure Draw	06/25/1999		
P30320D	48	71	29		UNA	RES	RES	Temporary North Pit Reservoir	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	08/29/1989	6000	CFS
P30320D	48	71	29		UNA	RES	RES	Temporary North Pit Reservoir	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	08/29/1989	6000	CFS
P30320D	48	71	29	NENE	UNA	RES	RES	Temporary North Pit Reservoir	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	08/29/1989	6000	CFS
P8663R	48	71	29	NENE	UNA	ORI	TEM,IND,MIS,FLO	Northwest	Amax Coal West, Inc.	Draw #2	07/11/1983	46.51	ACFT
P30320D	48	71	29	SENE	UNA	RES	RES	Temporary North Pit Reservoir	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	08/29/1989	6000	CFS
P9521R	48	71	29	NESW	UNA	ORI	IND,FLO,REC, STO, FIS,WIL,TEM	Temporary North Pit Res	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	07/10/1989	617.8	ACFT
P9521R	48	71	29	NWSW	UNA	ORI	IND,FLO,REC, STO, FIS,WIL,TEM	Temporary North Pit Res	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	07/10/1989	617.8	ACFT
P9521R	48	71	29	SWSW	UNA	ORI	IND,FLO,REC, STO, FIS,WIL,TEM	Temporary North Pit Res	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	07/10/1989	617.8	ACFT
P9521R	48	71	29	SESW	UNA	ORI	IND,FLO,REC, STO, FIS,WIL,TEM	Temporary North Pit Res	Amax Coal Company	Caballo (Cavajo) Creek/Horse Creek	07/10/1989	617.8	ACFT
P9681R	48	71	29	NESE	UNA	ORI	IND	Enl. Temporary North Pit	Amax Coal Co.	Horse Creek/Caballo (Cavajo) Creek	06/05/1990	999.21	ACFT
P9681R	48	71	29	NWSE	UNA	ORI	IND	Enl. Temporary North Pit	Amax Coal Co.	Horse Creek/Caballo (Cavajo) Creek	06/05/1990	999.21	ACFT
P10920R	48	71	29	SWSE	UNA	ORI	IND,STK,WIL	Sediment Ba65	Belle Ayr Mine RAG Coal West, Inc.	Horse Creek Or Caballo (Cavajo) Creek	08/26/1999		
P9681R	48	71	29	SWSE	UNA	ORI	IND	Enl. Temporary North Pit	Amax Coal Co.	Horse Creek/Caballo (Cavajo) Creek	06/05/1990	999.21	ACFT
P9681R	48	71	29	SESE	UNA	ORI	IND	Enl. Temporary North Pit	Amax Coal Co.	Horse Creek/Caballo (Cavajo) Creek	06/05/1990	999.21	ACFT

Note: The above table was generated from SEO computer records which have not been updated to reflect permit transfers from AMAX to RAG.

make a determination as to whether or not the area is or has been important to farming. The AVF determination is required during the state mine permitting process.

An AVF study was completed covering the entire Belle Ayr Mine permit boundary. AVF areas are present along Caballo Creek, but no AVF areas are present on the Belle Ayr 2000 Tract.

3.8 WETLANDS

Waters of the US is a collective term for all areas subject to regulation by the US Army Corps of Engineers (COE) under section 404 of the Clean Water Act. Wetlands generally include swamps, marshes, bogs, and similar areas" [33 CFR 328.3(a)(7)(b)]. Jurisdictional wetlands are defined by 33 CFR 328.1 and .2 as "those wetlands which are within the extent of COE regulatory review." They must contain three components: hydric soils, a dominance of hydrophytic plants, and wetland hydrology. Many wetland scientists consider areas that contain only one of the three criteria listed above as functional wetlands. The US Fish and Wildlife Service (USFWS) used this categorization in producing the national wetlands inventory maps. These maps are produced using aerial photo interpretation with limited field verification.

The presence of wetlands on a mine property does not preclude mining. Jurisdictional wetlands must be identified and special permitting procedures are required to assure that after mining there will be no net loss of wetlands. A wetland delineation must be completed according to approved procedures (COE 1987) and submitted to the COE for verification as to the amounts and types of jurisdictional wetlands present. In Wyoming, once the delineation has been verified, it is made a part of the mine permit document. The reclamation plan is then revised to incorporate at least an equal type and number of acres of jurisdictional wetlands. Section 404 does not cover functional wetlands. They may be restored as required by the surface managing agency (on public land), or by the private landowner.

A wetlands inventory has been completed for the Belle Ayr 2000 Tract, and that inventory has been approved by the COE. The results of that inventory indicate that there are no wetlands located on the Belle Ayr 2000 Tract.

3.9 VEGETATION

A vegetation inventory of the Belle Ayr Mine permit area, including the Belle Ayr 2000 Tract, was conducted by Stoecker-Keammerer and Associates in the summer of 1984. This inventory identified the major vegetation types and the minimum areal extent of the extended reference areas against which an assessment of revegetation success can me made. The vegetation inventory is presented in Appendix 2.8-1 of WDEQ Permit to Mine #214. The vegetation types and sample locations are given on Map 2.8-1.

A small portion of the northeast corner of Section 29 of the Belle Ayr 2000 Tract was previously disturbed and occupied by a homestead. The remainder of the Belle Ayr 2000 Tract was classified as agricultural land. Specifically, it is part of a crested wheatgrass field used primarily for pasture, but occasionally used as hayland. No vegetative sampling for production or cover was completed on the Belle Ayr 2000 Tract because of its agricultural use and disturbed homestead area.

Inventories for threatened and endangered plant species are discussed in Appendix C.

3.10 WILDLIFE

3.10.1 WILDLIFE RESOURCES

Because of its proximity to two active coal mines, extensive wildlife information is available for the Belle Ayr 2000 Tract. The Belle Ayr 2000 Tract was not specifically studied by either mine.

The Belle Ayr 2000 Tract is dominated by seeded grassland habitat. This habitat is generally a monoculture of crested wheatgrass, although a few native grasses and forbs have invaded. Seeded grassland is used as hayland and grazingland. Some areas, when not hayed or heavily grazed, provide a mid-grass habitat type with considerable vegetation cover.

This section contains summarized information from Belle Ayr's approved WDEQ/LQD permit to mine #214. Annual monitoring has been conducted on the Belle Ayr mine site since 1984. More detailed information may be found in the permits and annual reports for both the Belle Ayr and Caballo Mines.

3.10.2 BIG GAME

Pronghorn (*Antilocapra america)* are common at the mine site and throughout Campbell County and range through all cover types. They have been observed grazing near mining equipment and buildings at the Belle Ayr Mine during all hours.

Pronghorn density in the vicinity of the Belle Ayr Mine has been consistently higher than that recorded in the multi-mine area. Aerial survey results from 1988 through 1999 demonstrate that pronghorn generally have been most concentrated in the 20% of the Belle Ayr survey area that lies west of Wyoming Highway 59.

Mule deer (*Odocoileus hemionus*) are common on the Belle Ayr property in rough breaks and along the bottomlands and draws of Caballo Creek. The number of mule deer observed during the aerial surveys has ranged from 18 to 120. Annual variations in deer

53

totals may not be significant. The aerial surveys, as conducted, are designed primarily to census pronghorn, and probably do not yield accurate counts of deer. However, it is quite likely that the deer population around Belle Ayr has increased in recent years. Prior to 1996, the maximum number of deer seen during a survey was 67 animals. During each of the last four years, over 90 deer were recorded. Driving survey results from 1993 through 1999 indicate that mule deer numbers have increased in recent years.

Whitetail deer (*Odocoileus virginianus*) are common east and west of Campbell County along stream bottoms of the Black Hills and Bighorn Mountains. Wyoming Game and Fish Department personnel believe that the whitetail deer is extending its range along major stream drainages and may eventually build small populations in Campbell County in suitable habitat. Few whitetail deer have been found on the study area.

Individuals from the Rochelle Hills elk (*Cervus canadensis*) herd unit occasionally range into the Belle Ayr permit area. Few have been seen on the study area.

3.10.3 OTHER MAMMALS

Small mammals include species from the orders Insectivora (family - Soricidae) and Rodentia (families - Sciuridae, Geomyidae, Heteromyidae, Cricetidae, and Muridae), primarily shrews and small burrowing rodents.

Eight species of small mammals were captured at Belle Ayr in 1999. Captures included deer mouse (*Peromyscus maniculatus*), Thirteen-lined ground squirrels (*Spermophilus tridecemlineatus*), Meadow voles (*Microtus pennsylvanicus*), vest mice (*Reithrodontomys megalotis*), and Olive-backed pocket mice (*Perognathus fasciatus*). Only individuals of the remaining three species were caught: the long-tailed weasel (*Mustela frenata*), sagebrush vole (*Lemmiscus curtatus*), and shrew (*Sorex* spp.). These species also have been captured in prior years, but never in substantial numbers. In addition to the trapped species, three other species, least chipmunk (*Eutamias minimus*), bushytail woodrat (*Neotoma cineria*), and Ord's kangaroo rat (*Dipodomys ordi*) have been observed on the Belle Ayr Mine study area.

The deer mouse was the most ubiquitous and abundant small mammal captured. It was the only species trapped in all habitats, and accounted for 78% of total captures. The thirteen-lined ground squirrel (*Spermophilis tridecemlineatus*) was caught in seven habitats, but was common on only the reclaimed grassland transect.

Meadow voles (*Microtus pennsylvanicus*) and harvest mice (*Reithrodontomys megalotis*) also were trapped in a variety of habitats, but usually only in small numbers. Meadow voles were most abundant in habitats where the understory was relatively dense--

54

bottomland and tree windbreak. Harvest mice were most common in reclaimed and seeded grassland habitats. Olive-backed pocket mice (*Perognathus fasciatus*) were recorded infrequently in seeded grassland and sagebrush-grassland.

Two lagomorph (rabbit) species were observed during 1999; the cottontail (*Sylvilagus* spp.) and white-tailed jackrabbit (*Lepus townsendi*). Although this area is within the range of the black-tailed jackrabbit (*L. californicus*), none were observed. During spotlight surveys in 1999, lagomorph abundance was 1.4 animals per survey mile. Cottontails were observed more often than jackrabbits; jackrabbits were only seen on one night. Most lagomorphs were recorded in reclaimed grassland and disturbed areas (roads) during the surveys.

As noted, lagomorph abundance would be expected to influence the occurrence and breeding success of large raptors. Annual production of two such species--ferruginous hawks and red-tailed hawks--was extremely low in 1993, but has gradually increased in subsequent years. Because only one pair of golden eagles nests in the area, the potential for increased production for that species is limited. When raptor production was graphed as a function of lagomorph abundance, a positive correlation was apparent.

Numerous interesting wildlife species were observed in this area throughout 1999. Several species of predators and furbearers were observed this year. A coyote (*Canis latrans*) was seen standing along the reclaimed channel of Caballo Creek in April. A raccoon (*Procyon lotor*) was observed along the bank of Caballo Creek in the haylands in the southeast corner of the permit area; raccoons also have been recorded in that area during previous years. A striped skunk (*Mephitis mephitis*) was observed on the haul road near the scoria pit.

A bobcat (*Lynx rufus*) was seen sleeping on an inactive raptor nest in the scoria cliffs near the tire pad in spring 1999. Two bobcats were seen in the scoria rough breaks south of the railroad loop during lagomorph spotlight surveys in late summer. Muskrats (*Ondatra zibethicus*) were observed in native and reclaimed reaches of Caballo Creek during waterfowl surveys.

3.10.4 RAPTORS

A variety of raptor species are known to nest in the Powder River Basin. Habitat is limited for those species that nest exclusively in trees or on cliffs, but several species are adapted to nesting on the ground, on creek banks, buttes, or rock outcrops. Nine species of diurnal raptors and one species of owl have been observed on the Belle Ayr study area. Potential nesting habitat exists for golden eagles (*Aquila chrysaetus*), Swainson's hawks *(Buteo swainsoni*), red-tailed hawks (*Buteo jamaicensis*), harriers (*Circus cyaneus*), American kestrels (*Falco sparverius*), ferruginous hawks (*Buteo regalis*) and great horned owls (*Bubo* *virginianus*). These species historically breed and nest in the Belle Ayr Mine wildlife study area vicinity.

Through 1998, a total of 106 raptor nests had been located in the Belle Ayr Mine raptor survey area. Over time, many nests have been destroyed by natural forces; others were relocated for mitigation or removed by mining activities. At the end of the 1998 breeding season, there were 48 known and intact within the Belle Ayr Mine survey area.

In 1999, one new nest was discovered and six nests were destroyed by natural causes. The addition of 1 nest and loss of 6 left a total of 43 known and intact raptor nests in the Belle Ayr Mine survey area as of 1 August 1999. Twenty-seven of those nests were on the permit area, and 16 were in the surrounding perimeter.

Existing nests included:

22	ferruginous hawk (*Buteo regalis*) nests,
3	golden eagle(*Aquila chrysaetus*), nests,
4	burrowing owl (*Speotyto cunicularia*) nests,
3	great horned owl (*Bubo virginianus*) nests,
3	red-tailed hawk (*Buteo jamaicensis*) nests,
1	Swainson's hawk (*Buteo swainsoni*) nests,
2	northern harrier (*Circus cyaneus*) nests,
1	Swainson's hawk/great horned owl nests,
1	Swainson's hawk/red-tailed hawk nest,
1	great horned owl/ferruginous hawk nest,
1	golden eagle/ferruginous hawk nest, and
1	red-tailed hawk/great horned owl nest.

None of the existing nests are located on the Belle Ayr 2000 Tract.

Nine pairs of raptors nested in the Belle Ayr area in 1999; five of those pairs fledged a total of ten young. Raptors that successfully nested included: two pairs of red-tailed hawks; and one pair each of ferruginous hawks, Swainson's hawks, and golden eagles . Two additional pairs of Swainson's hawks and a third pair of red-tailed hawks incubated, but did not hatch young. One pair of northern harriers nested twice; their first nest was depredated, and they abandoned their second nest prior to hatching.

Three species of large raptors--ferruginous hawks, red-tailed hawks, and golden eagles--have consistently nested in the area from 1988 through 1999. Annual productivity of those species has fluctuated, but young have fledged during each of the last 12 years.

Prey availability, especially lagomorph abundance, has undoubtedly influenced the breeding success of the large raptors through time. The decrease in productivity for those raptor species after 1992 was probably related to a striking reduction in lagomorph populations in late winter 1992-1993. Although rabbit numbers have not yet returned to pre-1993 levels, populations do appear to be increasing, and the productivity of large raptors in the Belle Ayr survey area has risen slightly in recent years.

Great horned owls also are known to regularly breed in the area . Great horned owl production in the Belle Ayr Mine area has never been very high, but owls consistently fledged young each year from 1988 through 1991 However, the secretive nature of great horned owls, which often nest in hidden sites (such as potholes, building rafters, abandoned buildings, and tree cavities), can result in underestimated annual production for that species.

Overall, ferruginous hawks have been the most prolific raptors in the Belle Ayr survey area. Nineteen territories have been identified through 1999. As many as seven pairs have nested in a single year; at least three pairs nested during 10 of the last 12 years. Annual productivity has ranged from 2 to 16 young.

Six red-tailed hawk territories were identified through 1999; four territories contained intact nests this year. At least one pair fledged young in each of the last 12 years . For seven consecutive years (1993 through 1999), red-tailed hawks have successfully nested on platform, within 800 feet--and in full view--of the Belle Ayr Mine shop and truck ready line. The platform has been used despite the existence of a nearby natural nest

Eight Swainson's hawk territories have been identified in the raptor survey area through 1999; only three territories contained intact nests this year. Swainson's hawks fledged young in 9 of the last 12 years; no young fledged from 1993 through 1995. Because Swainson's hawks prey primarily on rodents, the recent decline in lagomorph populations probably has not influenced that species' breeding success. However, data from small mammal trapping at Belle Ayr showed very low rodent populations in 1993. Rodent abundance was considerably higher in 1996 (the next trapping period), and numbers also were relatively high in 1999. Swainson's hawk production also increased in 1996, and young have fledged during each of the subsequent three years.

Only one of the two golden eagle territories identified in the survey area has been active since 1988. That pair fledged young in nine of the last twelve years. In 1990, the eagles began voluntarily using a platform beyond the permit area, and they have used that platform each subsequent year. Except for 1994 and in 1998, the pair fledged at least one young from the platform each year.

Historically, burrowing owls have nested in the area. Nine burrowing owl nest sites have been identified; five of those sites, however, have been destroyed by natural causes or removed by mining activities. Four pairs nested in 1988, but usually just one pair of owls bred in the area each year from 1990-1992. Although nest sites have been available, no nesting burrowing owls have been located since 1992.

Northern harrier nesting success in the area has been sporadic since they were first found in 1990. However, nesting attempts and success have been sporadic during the last ten years; young fledged from known nests in only four years. Through time, at least two pairs have nested in reclaimed areas or on vegetated topsoil stockpiles on the permit area.

One short-eared owl nest was discovered in 1994; three young fledged from the site that year. Although adults have been observed in the Belle Ayr Mine area since then, no young had been found until 1999. This year fledged young were seen on and near the permit area, but no new nests were located.

Locations of nests and detailed information regarding raptors at the Belle Ayr and Caballo Mines are presented in the Annual Reports for each mine. All active nests are included in the raptor mitigation plans developed for the existing Belle Ayr and Caballo Mines. Those plans have been approved by the USFWS and WDEQ/LQD, and include the Belle Ayr 2000 Tract. If a lease is issued for the Belle Ayr 2000 Tract, the lessee will be required to update their raptor mitigation plan to include mining activities on the tract.

3.10.5 GAME BIRDS

Sage grouse (*Centrocercus urophasianus*), gray partridge (*Perdix perdix*), and the sharp-tailed grouse (*Tympanuchus phasianellus*) were observed on the Belle Ayr permit area in 1999.

Sage grouse were dispersed throughout the Belle Ayr Mine wildlife study area on sage-grass steppes near water. The Belle Ayr lek was active in 1990 and 1991, but grouse attendance was low; no more than 12 males were ever recorded. The lek was inactive from 1992 through 1996. Four to five male grouse were observed displaying approximately 500 feet north of the original Belle Ayr lek site on three mornings in spring 1999. Two hens were also seen at that site during the early April check. One hen was observed on the actual Belle Ayr lek during the mid-April check. No new leks were found in 1999, but a few incidental grouse observations were recorded in spring.

Most game bird sightings occurred on the permit area in early September. A flock of 16 gray partridge was seen in reclaimed grassland on two consecutive days. Eighteen birds were recorded in reclaimed shrubland, approximately one mile to the south, later that week. Two adults and four juveniles were observed in seeded grassland. A flock of 10 to 12 sharp-tailed grouse flushed from a sunflower (*Helianthus* spp.) patch along a reclaimed channel of Caballo Creek

3.10.6 OTHER AVIAN SPECIES

Across all habitats, 28 bird species were detected within transects on the Belle Ayr permit area. Five additional species were recorded only as incidental flyovers. Data from belt transects were used to calculate species richness and abundance for each of the eight habitats on the Belle Ayr permit in 1999. The sagebrush type was highest in breeding bird abundance and species richness, with 95 pairs per 100 acres, and a total of seven species. The native grass type had a species richness of four. Improved pasture supported only two species, but a great abundance (40 pairs per 100 acres) of horned larks.

Western meadowlarks (*Sturnella neglecta*) and vesper sparrows (*Pooecetes gramineus*) were the only species to occur in all eight habitats . Horned larks (*Eremophila alpestris*) were regularly observed in all native upland habitats, except rough breaks, but none were recorded in either bottomland habitat. Small numbers of lark buntings (*Calamospiza melanocorys*) were seen in five habitats; none were recorded on transects in reclamation.

Several species were predictably associated with specific habitats. Rock wrens (*Salpinctes obsoletus*) were observed only in rough breaks. Longspurs (*Calcarius spp.)* were seen exclusively in native grassland. Red-winged blackbirds (*Agelaius phoeniceus*) and spotted sandpipers (*Actitis macularia*) were only recorded in bottomlands. Red-winged blackbirds were more numerous than other species in both bottomland habitats.

3.10.7 FISHES

As Draw No. 2, an ephemeral stream, is the only body of water located on the Belle Ayr 2000 Tract, aquatic habitat is non-existent.

3.10.8 THREATENED AND ENDANGERED SPECIES

The potential occurrence of threatened and endangered wildlife species at the Belle Ayr 2000 Tract is discussed in Appendix C.

3.10.9 MIGRATORY BIRDS OF HIGH FEDERAL INTEREST

Eight raptors listed as Migratory Birds of High Federal Interest (MBHFI) were observed at the Belle Ayr Mine in 1999. Six of the MBHFI were raptors: golden eagles (*Aquila chrysaetos*), ferruginous hawks (*Buteo regalis*), bald eagles (*Haliaeetus leucocephalus*), prairie falcons (*Falco mexicanus*), peregrine falcons (*Falco peregrinus*), and Richardson's merlins (*Falco columbarius*). The first two species have nested at Belle Ayr, but not on the Belle Ayr 2000 Tract.

The two non-raptor MBHFI were the American white pelican (*Pelecanus erythrorhynchos*) and double-crested cormorant (*Phalacrocorax auritus*). Over the last ten years, raptors and cormorants were the only MBHFI consistently seen in the Belle Ayr survey area

Bald eagles occur only as winter visitors to Campbell County. This species is commonly observed on and near the permit area from November to March. However, there is no appropriate roosting habitat on or near the area; the nearest known roost is several miles southeast in the Rochelle Hills. There do not appear to be any unique habitat features or prey sources that would make Belle Ayr more attractive to bald eagles than surrounding lands.

Prairie falcons have been observed on the survey area almost every year either flying over or foraging. No natural cliffs suitable for nesting are present on the Belle Ayr 2000 Tract or in this area. Prairie falcons were seen in late summer and fall 1999. Richardson's merlins are an uncommon visitor, but no typical merlin nest sites, old magpie (*Pica pica*) nests, exist at Belle Ayr. Most observations have been during the non-breeding season. Merlins were observed on the permit area twice in 1999. On 30 July, an adult female was seen perched on a fence-post in seeded grassland. Merlins have been recorded in that same general area in previous years. Migrating peregrine falcons have been observed rarely in the area, but no suitable nesting habitat (tall cliffs) for peregrines exists near Belle Ayr. One adult peregrine falcon was seen on the permit area. The bird was perched on a bank overlooking Caballo Creek. A peregrine was observed in that same general area in May 1998. Peregrine falcons have been recorded at least once during each of the last four years. All sightings were probably birds migrating through the area.

Double-crested cormorants were observed on the permit area twice in both spring and early summer 1999. On 19 May, one bird was seen perched on a rock in a reclaimed reach of Caballo Creek. Six cormorants were recorded flying over Caballo on 26 May. In mid-June, biologists saw one adult flying over the creek in. An adult was observed on Sedimentation Reservoir 19 about one week later.

American white pelicans were observed on the permit area once in 1999. On 12 May, nine birds were seen standing on the bank along Caballo Creek.

Long-billed curlews (*Numenius americanus*) have rarely been observed in the area, and have not nested in the vicinity of Belle Ayr. There is neither suitable staging nor breeding habitat on the survey area for sandhill cranes (*Grus canadensis*), although one individual was seen on the ground in 1993. Flocks of cranes have been observed flying over during migration. Whooping cranes (*Grus americana*) are not known to pass through the area.

Mountain plovers (*Charadrius montanus*) and dickcissels (*Spiza americana*) have never been recorded at Belle Ayr, Caballo, or other adjacent mines. Grassland habitat at Belle Ayr does not appear to be as sparsely vegetated as known mountain plover habitat in Converse County. The principal breeding range of the dickcissel is east of Wyoming, but northeast Wyoming is included in the irruptive breeding range of this species (Evans and Bartels 1983). Habitats used by nesting dickcissels (hayfields, weedy roadsides, fencerows, ungrazed prairie) generally possess taller vegetation than is found on the Belle Ayr survey area.

The absence of wooded habitat prevents the Lewis' woodpecker (*Melanerpes lewis*) from occurring on the area. None have been observed at Belle Ayr or adjacent mines.

3.11 OWNERSHIP AND USE OF LAND

The surface on the Belle Ayr 2000 Tract is owned entirely by RAG Wyoming Land Company, Inc. The surface has been used as improved pastureland. A homestead was formerly located in the northwest corner of Section 28, and extended into the northeast corner of Section 29.

Bishop Road crosses the Belle Ayr 2000 Tract and is the main transportation corridor for workers traveling to and from work at the Belle Ayr Mine and the Caballo Mine. An underground telephone line owned by Qwest crosses the northern part of the Belle Ayr 2000 Tract, and an overhead power line associated with mining activities at the Belle Ayr Mine also crosses the area.

A portion of the Belle Ayr 2000 Tract has been disturbed as part of support activities associated with mining the active leases at the Belle Ayr Mine. The Belle Ayr 2000 Tract is located entirely within the permit and affected area boundaries of the Belle Ayr Mine and partially within the permit and affected area boundaries of the Caballo Mine. Therefore, both mines are permitted to disturb the surface of the area within their affected area boundaries for overstrip and layback, highwall reduction, borrow, stockpiling of topsoil and overburden, construction of access roads, diversion ditches and surface water control structures. Because of the current mining support activities on the Belle Ayr 2000 Tract, the area is restricted to public access, limiting its use for agricultural or hunting purposes. Belle Ayr Mine allows hunting on the Clabaugh pasture north of the Belle Ayr 2000 Tract in Section 21, but not on the Belle Ayr 2000 Tract.

Coal underlying the Belle Ayr 2000 Tract is owned by the United States of America, and is managed by BLM. Oil and gas rights are privately owned. No active oil and gas wells are located on the Belle Ayr 2000 Tract, but there are permits approved by the Wyoming Oil and Gas Conservation Commission to drill 4 coal bed methane wells. One plugged and abandoned dry hole is present on the tract. As the surface owner, RAG Wyoming Land Company, Inc. has agreements with the private oil and gas lessee that would allow the mine-through of coal bed methane wells if any are drilled and completed prior to mining.

3.12 CULTURAL RESOURCES

As part of the permitting process, detailed cultural resources surveys have been conducted on the Belle Ayr 2000 Tract and the adjacent mine permit areas. As a result of these surveys, one archeological find was identified on the Belle Ayr 2000 Tract. This site is not eligible for registry with the National Register of Historic Places (NRHP). More detailed information about archeological site 48CA2807 is presented in Section 2.3 of the WDEQ/LQD Permit #214. Since this site is not eligible for NRHP; it does not present an encumbrance to mining.

No sites Native American religious or cultural importance have been identified on the Belle Ayr 2000 Tract to date.

3.13 PALEONTOLOGICAL RESOURCES

The formations exposed on the surface of the Powder River Basin are the sedimentary Eocene Wasatch and Paleocene Fort Union formations, which are both known to contain fossil remains. Some paleontological surveys have been conducted in the Powder River Basin. Vertebrate fossils that have been described from the Wasatch Formation in the Powder River Basin include fish, turtle, champosaur, crocodile, alligator, and mammal specimens. The Fort Union also contains fossils of plants, reptiles, fish, amphibians, and mammals.

Paleontological surveys have been conducted in the vicinity of the Belle Ayr 2000 Tract, and no vertebrate fossils have been identified in the Wasatch Formation. No paleontological resources would be expected on the Belle Ayr 2000 Tract because of the grassy, gently sloping terrain with no exposures or outcrops.

3.14 VISUAL RESOURCES

Visual sensitivity levels are determined by people's concern for what they see and the frequency of travel through an area. Landscapes within the general analysis area include rolling sagebrush and short-grass prairie, which are common throughout Campbell County and eastern Wyoming. Existing surface mines are visible from Bishop Road. Other man-made intrusions include ranching activities (fences, homesteads, livestock), oil and gas

62

development (pumpjacks, pipeline ROW's), transportation facilities (roads and railroads), and electric power transmission lines. The natural scenic quality in the immediate lease area is fairly low because of the industrial nature of the adjacent existing mining operations.

For management purposes, BLM evaluated the visual resources on lands under its jurisdiction in the Buffalo Resource Area RMP. The inventoried lands were classified into VRM classes. The lands in the Belle Ayr 2000 Tract area are generally classified as VRM Class IV (existing activity attracts attention and is a dominant feature of the landscape in terms of scale) and Class V (areas where the natural character of the landscape has been disturbed up to a point where rehabilitation is needed to bring it up to the level of one of the other four classifications. The existing mining activity at the Belle Ayr and Caballo mines is visible from or active on the Belle Ayr 2000 tract.

3.15 NOISE

Existing noise sources in the area include adjacent coal mining activities, traffic on Bishop Road, rail traffic, and wind. Studies of background noise levels at adjacent mines indicate that ambient sound levels generally are low, owing to the isolated nature of the area. Mining activities are characterized by noise levels of 85-95 dBA at 50 feet from actual mining operations and activities (BLM 1992b). Table 3-6 presents noise levels associated with some commonly heard sounds.

The nearest residence to the Belle Ayr 2000 Tract is located more than 1.5 miles to the west. Several residences are located approximately 2 miles northwest of the Belle Ayr 2000 Tract at the intersection of Bishop Road and Highway 59.

3.16 TRANSPORTATION FACILITIES

Transportation resources in the vicinity of the Belle Ayr 2000 Tract include Bishop Road, the rail spur, and local roads (Figure 2-1).

Since the Belle Ayr 2000 Tract as applied for would be a maintenance lease for an existing mine, no new transportation facilities or infrastructure would be needed. However, Bishop Road would have to be relocated to allow mining underneath the road and right of way if the Belle Ayr 2000 Tract is leased as applied for.

As discussed in Section 3.11, an active underground telephone line crosses the Belle Ayr 2000 Tract. An overhead power line owned by RAG and used for mining purposes crosses the LBA tract.

Table 3-6
Relationship Between A-Scale Decibel Readings and Sounds of Daily Life

	How it Feels	Equivalent Sounds	DECIBELS	Equivalent Sounds	How it Sounds
	Near permanent damage from short exposures	50 hp siren (100 ft.) Jet engine (75 ft.)	130	Jackhammer Chainsaw	135 dB(A) Approx. 64 times as loud as 75 dB(A)
	Pain to ears	Turbo-fan jet at takeoff power (100 ft.)	120	Firecracker (15 ft.) Rock and Roll Band	125 dB(A) Approx. 32 times as loud as 75 dB(A)
	Uncomfortably Loud	Scraper-Loader	110	Unmuffled Motor Bike (2-3 ft.)	115 dB(A) Approx. 16 times as loud as 75 dB(A)
	Discomfort Threshold	Jet flyover (1000 ft.) Noisy newspaper press	100	Car horn Unmuffled Cycle (25 ft.)	105 dB(A) Approx. 8 times as loud as 75 dB(A)
	Very Loud	Air compressor (20 ft.) Power lawnmower	90	Garbage Trucks and City Buses Diesel Truck (25 ft.)	95 dB(A) Approx. 4 times as loud as 75 dB(A)
	Conversation stops	Steady flow of freeway traffic 10-HP Outboard Motor	80	Garbage Disposal Food Blender	85 dB(A) Approx. 2 times as loud as 75 dB(A)
	Intolerable for phone use	Automatic Dishwasher Vacuum cleaner	70	Muffled Jet Ski (50 ft.) Passenger Car 65 mph (50 ft.)	75 dB(A)
	Extra auditory physiological effects	Window air conditioner outside (2 ft.)	60	Busy downtown area	
	Quiet Sleep interference	Window air conditioner in room Occasional private auto at 100 ft.	50	Normal Converstion	55 dB(A) Approx. 1/4 times as loud as 75 dB(A)
		Quiet home during evening Bird Calls	40		45 dB(A) Approx. 1/8 times as loud as 75 dB(A)
		Library Soft whisper 5 ft.	30		35 dB(A) Approx. 1/16 times as loud as 75 dB(A)
			20	In a quiet house at midnight	
		Leaves Rustling	10		

Adapted from ABC's of Our Noise Codes published by Citizens Against Noise, Honolulu, Hawaii

3.17 SOCIOECONOMICS

The social and economic study area for the proposed project involves primarily Campbell County and the cities of Gillette and Wright. Employment at the Belle Ayr Mine as of August 1, 2000 was 236, however, RAG recently announced that 48 people would be laid off at the RAG's Belle Ayr and Eagle Butte Mines by the end of 2000. Of the current employees at Belle Ayr Mine, 79 percent live in Campbell County, with the remaining 21 percent living in other Wyoming communities (Belle Ayr Mine, 2000).

A comprehensive socioeconomic profile of the BLM Buffalo Resource Area (which includes all of Campbell County) was prepared for the BLM under contract with the Department of Agricultural Economics, College of Agriculture, through the University of Wyoming's Cooperative Extension Service (University of Wyoming, 1994). The following discussion that deals with Campbell County is derived from this report. Additional Campbell County data were obtained from the Wyoming Department of Commerce, Wyoming Division of Economic Analysis, Wyoming Department of Employment, Wyoming Economic Development Office, and personal communications with local community development staff.

3.17.1 POPULATION

According to 1990 census data, Campbell County had a population of 29,370, with Gillette accounting for 17,635 of the county's residents and Wright with 1,200. The 2000 population of Campbell County was estimated at 32,930 (U.S. Bureau of Census website, October 2000). The 1998 population of Gillette was estimated at 21,817 (Campbell County Economic Development Corporation 2000). The 1996 population of Wright was estimated at 1,400.

3.17.2 LOCAL ECONOMY

In 1997, 24 percent of the total employment and 28 percent of the total personal income in Campbell County were directly attributable to mining (Wyoming Department of Employment, 1999). Coal production, as reported by the Wyoming State Inspector of Mines, showed the State's coal producers set a new yearly production record of 336.5 million tons in 1999. This was an increase of 6.5 percent over the 315.0 million tons produced in 1998. Campbell County coal production increased by 7.4 percent (274.1 million tons to 294.3 million tons) from 1998 to 1999.

Approximate tax revenues from coal production in Campbell County are presented in Table 3-7. Sales and use taxes are distributed to cities and towns within the county and to the county's general fund. Severance taxes are collected by the state for the removal or extraction of resources such as oil, natural gas, coal, and trona. The State of Wyoming retains approximately 83 percent of the severance tax, and the remainder is returned to the cities, towns, and counties. Ad valorem taxes, which include property taxes, are collected by the county and disbursed to schools, cities, towns, the state foundation, and various other subdivisions within the county. Mineral royalties are collected on the amount of production and the value of that production. The current royalty rate for federal coal leases is 12.5 percent, with half of this revenue returned to the state. Additional sources of revenue include lease bonus bids (also split with the state) and annual rentals that are paid to the federal government. The total fiscal benefit to the State of Wyoming from coal mining in the Powder River Basin has recently been estimated at $1.10/ton of coal mined (University of Wyoming 1994).

Nationally, the minerals industry is 1.3 percent of the GNP. In Wyoming, the minerals industry (including oil and gas) is 31 percent of the GSP, which makes it the largest sector of the Wyoming economy. Coal mining alone accounts for 9 percent of the Wyoming GSP (Wyoming Dept. of Administration and Information March 1999).

Table 3-7
Estimated 2000 Fiscal Revenues
from 1999 Coal Production in Campbell County

Collection Type	Amount
Sales and Use Collections[1]	$22.2 million
Severance Tax Collections[1]	$64.4 million
Ad Valorem Tax Collections[1]	$57.2 million
Royalty Collections[2]	$168.1 million
Total Collections	311.9 million

[1] Estimated tax receipts are based on most recent published records of Wyoming Department of Revenue.

[2] Royalties are based on 12½ percent of sales price on 1998 production, with sales price being the average for northeastern Wyoming (Wyoming Geo-Notes No. 61 March 1999).

3.17.3 EMPLOYMENT

Coal mining has changed a great deal since the 1970's, and new technologies have been a major contributor to these changes. The local coal mining labor force grew during the 1970's, but declined during the 1980's. Since 1973, overall production has risen while employee numbers have decreased. This employment decline followed large industry capital investments in facilities and production equipment, the majority of which was aimed at increasing productivity. Direct employment in the Powder River Basin coal mining industry has remained relatively constant over the last few years at approximately 3,100 full-time employees.

As of January 2000, the total labor force in Campbell County stood at 19,804 with an unemployment rate of 4.5 percent, compared to 4.2 percent in December 1998 (Wyoming Department of Employment, Research and Planning 2000). At the beginning of 1999 around 2,808 people were directly employed in coal mining, representing about 15 percent of the employed labor force (Wyoming Department of Employment 1999).

Total employment in Campbell County peaked in 1985 at 21,668, the same year that mining employment (which in this case includes oil and gas workers) peaked at 6,312. Total employment declined to a low of 18,103 in 1988, and has generally increased since that time. The current CBM development has resulted in a tight local labor market for both skilled and unskilled labor, however the mining industry has not had difficulty filling positions, even in a tight labor market. The mining industry is the employer of choice in Campbell County due to attractive wage and benefit packages and predictable schedules (Betsy Hockert, Wyoming Employment Center, Gillette, personal communication October 17, 2000).

3.17.4 HOUSING

In 1996, Gillette contained 7,775 housing units, and Wright contained 497 housing units, according to the Campbell County Economic Development Corporation (1997 Community Profile). According to the 1990 census, Campbell County contained 11,538 housing units, 7,078 of which were in Gillette. In early 2000, the average cost of a new 3-bedroom home in Gillette was $130,000; the average cost of an existing 3-bedroom home was $89,000. In Wright, the average 2000 prices of new and existing 3-bedroom homes were $88,000 and $72,000, respectively. Residential building permits in Campbell County rose from 15 in 1987 to 82 in 1992 to 100 in 1998 (the last year that data are available).

3.17.5 LOCAL GOVERNMENT FACILITIES AND SERVICES

Gillette has generally maintained a steady population growth since 1987, when it totaled 17,054. Owing to the substantial revenues generated by mineral production, local government facilities and services have kept pace with growth and are adequate for the current population. The opening of the new South Campus of Campbell County High School has helped to alleviate overcrowding at the "North Campus." South Campus opened on February 1, 1999 with approximately 300 students and 22 teachers. Beginning with the 1999-2000 school year the numbers have increased to approximately 600 students and 33 teachers.

Wright was established in 1976 by ARCO and is the nearest community to the southern group of Powder River Basin mines. Wright's population peaked in 1985 at approximately 1,800 and decreased to 1,285 by 1994. The 1996 population of Wright was 1,400. Currently, (Fall of 2000) the town of Wright is not experiencing population growth due to CBM development (Tammie Buresh, Wright Water and Sewer District, personal communication October 17, 2000). Wright's infrastructure is adequate for the current and planned population, and with the current building going on it can double in population before services become limiting.

3.17.6 SOCIAL CONDITIONS

Despite past boom and bust cycles in the area's economy, a relatively stable social setting now exists in these communities. Most residents have lived in the area for a number of years, social ties are well established, and residents take great pride in their communities. Many of the people place a high priority on maintaining informal lifestyles and small town traditions, and there are some concerns that the area could be adversely affected by more than a modest growth in population. At the same time, there is substantial interest in enhancing the economic opportunities available in the area and a desire to accommodate reasonable levels of growth and development.

Wyoming's economy reached the bottom of an energy bust in 1987 and started to recover (Wyoming Department of Administration and Information, February 1999). That recovery began to slow in 1996. The forecast is for slow growth through 2008; Wyoming's population is projected to increase at 0.5 percent per year. Non-agricultural employment is projected to increase by 22 percent by 2008, increasing 1.4 percent in 2000 and then slowing to 1.1 percent per year by 2006. Mining employment is projected to decline by 8.2 percent by 2008. In 1998 there were 17,000 jobs in the mining sector. This dropped to 15,600 in 1999, with 1,000 jobs lost in oil and gas extraction, 300 in non-metallic minerals and 100 in coal mining (Wyoming Department of Administration and Information, February 2000).

3.17.7 ENVIRONMENTAL JUSTICE

Environmental Justice issues are concerned with actions that unequally impact a given segment of society either as a result of physical location, perception, design, noise, etc. On February 11, 1994, Executive Order 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations" was published in the *Federal Register* (59 FR 7629). The Executive Order requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations (defined as those living below the poverty level). The Executive Order makes it clear that its provisions apply fully to Native American populations and Native American tribes, specifically to effects on tribal lands, treaty rights, trust responsibilities, and the health and environment of Native American communities.

Communities within Campbell County, entities with interests in the area, and individuals

68

with ties to the area all may have concerns about the presence of a coal mine within the general analysis area. Communities potentially impacted by the presence or absence of a coal mine have been identified in this section of the EA. Environmental Justice concerns are usually directly associated with impacts on the natural and physical environment, but these impacts are likely to be interrelated with social and economic impacts as well. Native American access to cultural and religious sites may fall under the umbrella of Environmental Justice concerns if the sites are on tribal lands or access to a specific location has been granted by treaty right.

Compliance with Executive Order 12898 concerning Environmental Justice was accomplished through opportunities for the public to receive information on this EA in conjunction with the consultation and coordination described in Section 1.7 of this document. This EA and contributing socioeconomic analysis provide a consideration of impacts with regard to disproportionately adverse impacts on minority and/or low-income groups, including Native Americans.

3.18 HAZARDOUS AND SOLID WASTE

Potential wastes that would be generated in the course of mining the Belle Ayr 2000 Tract would be similar to the wastes that are currently being generated by the existing mining operation, where procedures for handling hazardous and solid waste are in place. Wastes generated by mining the Belle Ayr 2000 Tract would be handled in accordance with the existing regulations using the procedures currently in use at the Belle Ayr Mine. The mine currently maintains status as a conditionally exempt small quantity generator.

4 ENVIRONMENTAL CONSEQUENCES

This chapter discloses the potential environmental consequences that may result from implementing the Proposed Action or Alternative 1 (the No-Action Alternative). The effect or impact a consequence will have on the quality of the human environment is also discussed. For instance, the consequence of an action may be to greatly increase the number of roads in an area. If the number of roads in an area is increased, opportunities for road-based recreation would be increased but opportunities for primitive recreational activities and solitude would be decreased. Evaluation of the impact would depend on an individual's (or a group's) preferred use of that area.

Portions of the LBA tract that are adjacent to existing leases at both the Belle Ayr and Caballo Mines will be disturbed under the current mining plans in order to recover the coal in the existing leases. If the Belle Ayr 2000 Tract as applied for is leased to an existing mine as a maintenance lease, the net area of surface disturbance would increase by 118 acres over the No Action Alternative. Table 4-1 shows the area to be mined and disturbance area for the existing Belle Ayr Mine (which represents the No-Action Alternative), and how the mine area would change under the Proposed Action.

Surface mining and reclamation have been ongoing in the Powder River Basin for over two decades. During this time, effective mining and reclamation technologies have been developed and continue to be refined. Mining and reclamation operations are regulated under SMCRA and Wyoming statutes. WDEQ technically reviews all mine permit application packages to ensure that the mining and reclamation plans comply with all state permitting requirements and that the proposed coal mining operations comply with the performance standards of the DOI-approved Wyoming program. BLM attaches special stipulations to all coal leases (Appendix B), and there are a number of federal and state permit approvals that are required in order to conduct surface mining operations (Appendix A). The regulations are designed to ensure that surface coal mining impacts are mitigated. The impact assessment that follows considers all measures required by federal and state regulatory authorities as part of the Proposed Action and Alternatives.

Section 4.1 analyzes the direct and indirect impacts associated with leasing and mining the LBA tract under the Proposed Action. Section 4.2 presents the probable environmental consequences of the No-Action Alternative (Alternative 1, not issuing a lease for the tract). Section 4.3 discusses regulatory compliance, mitigation, and monitoring in terms of what is required by federal and/or state law (and is therefore part of the Proposed Action and No Action Alternative) and any additional mitigation and monitoring that may be required. Section 4.4 summarizes the residual effects of the Proposed Action. Section 4.5 discusses the cumulative impacts that would occur if these lands were mined when added to other past, present, and reasonably foreseeable future actions. The cumulative impact analysis includes a discussion of other projects

Table 4-1
Comparison of Existing and Proposed Disturbance Area and Mining Operations

	No Action Alternative (Existing Permit Area)	Added by Proposed Action
Federal Lease Area (Acres)	4,983.55	243.61
Increase in Lease Area	—	5%
Estimated Total Disturbance Area (Acres)[1]	8,441	118[2]
Increase in Estimated Disturbance Area	—	1.4%
Estimated Recoverable Coal Remaining as of 1/00 (Million Tons)	326.2	29
Increase in Estimated Recoverable Coal as of 1/00 (Percent)	—	9%

Notes:

[1] Total Disturbance Area = area to be mined + area disturbed for Mine facilities, access roads, haul roads, railroad facilities, stockpiles, etc.

[2] The 118 acres represent net acres of disturbance in addition to currently approved mining operations at the Belle Ayr and Caballo Mines.

71

that are in progress or are proposed in the area of the LBA tract and that would occur independently of leasing the LBA tracts. These projects include: 1) construction and operation of the Two Elk power plant, which has been proposed east of the Black Thunder Mine; 2) construction of Wygen #1 power plant which has been proposed at the Wyodak mine site; 3) the construction of the proposed DM&E Railroad line, and 4) the ongoing development of CBM resources west of the area of active coal mining. Section 4.6 analyzes the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. Section 4.7 presents the irreversible and irretrievable commitments of resources that would occur with implementation of the Proposed Action.

4.1 DIRECT AND INDIRECT IMPACTS OF ACTION ALTERNATIVES

Impacts can range from beneficial to adverse, and they can be a primary result of an action (direct) or a secondary result (indirect). They can be permanent, long-term (persisting beyond the end of mine life and reclamation), or short-term (persisting during mining and reclamation and through the time the reclamation bond is released). Impacts also vary in terms of significance. The basis for conclusions regarding significance are the criteria set forth by the Council on Environmental Quality (40 CFR 1508.27). Impact significance may range from negligible to substantial; impacts can be significant during mining but be reduced to insignificant following completion of reclamation.

4.1.1 TOPOGRAPHY AND PHYSIOGRAPHY

Surface coal mining would permanently alter the topography of the Belle Ayr 2000 Tract. Topsoil would be removed from the land and stockpiled or placed directly on recontoured areas. Overburden would be blasted and stockpiled or directly placed into the already mined pit, and coal would be removed. The existing topography on the Belle Ayr 2000 Tract would be substantially changed during mining. A highwall with a vertical height equal to overburden plus coal thickness would exist in the active pits. Bishop Road would be relocated. A direct, permanent impact would be topographic moderation. The restored land surface would contain gentler more uniform slopes, but the basic drainage network would be restored. Following reclamation, the average surface elevation would be approximately 30 - 40 feet lower due to removal of the coal. (The removal of the coal would be partially offset by the swelling that occurs when the overburden is blasted and removed.) The land surface would be restored to the approximate original contour or to a configuration approved by WDEQ/LQD during the permit revision process.

Direct adverse impacts resulting from topographic moderation could include a reduction in habitat diversity, particularly a reduction in slope-dependent shrub communities and associated habitat. A potential indirect impact may be a long-term reduction in big game carrying capacity. A direct beneficial impact of the lower and flatter terrain would

72

be reduced water runoff, which would allow increased infiltration and result in a minor reduction in peak flows. This may help counteract the potential for increased erosion that could occur as a result of higher near-surface bulk density of the reclaimed soils (see Section 4.1.3). It may also increase vegetative productivity, and potentially accelerate recharge of groundwater. The approximate original drainage pattern would be restored. These topographic changes would not conflict with regional land use, and the postmining topography would adequately support anticipated land use.

These impacts are occurring on the existing adjacent Belle Ayr Mine and Caballo Mine coal leases as coal is mined and mined-out areas are reclaimed. Portions of the Belle Ayr 2000 Tract have been or will be disturbed during already permitted mining of the adjacent leases. Under the Proposed Action, the area that would be permanently topographically changed would increase as shown in Table 4-1.

4.1.2 GEOLOGY AND MINERALS

Within the Belle Ayr 2000 Tract, mining would remove overburden and approximately 72 feet of coal on about 244 acres under the Proposed Action. The replaced overburden would be a relatively homogeneous and partially recompacted mixture (compared to the premining layered overburden) . Approximately 29 million tons of coal would be mined under the Proposed Action.

The geology from the base of the coal to the land surface would be subject to permanent change on the Belle Ayr 2000 Tract under the Proposed Alternative. The subsurface characteristics of these lands would be radically changed by mining. The replaced overburden (spoil) would be a mixture of the geologically distinct layers of sandstone, siltstone, and shales that currently exist. The physical characteristics of the replaced overburden would also be altered.

Drilling and sampling programs are conducted by all mine operators to identify overburden material that may be unsuitable for reclamation (i.e., material that is not suitable for use in re-establishing vegetation or that may affect groundwater quality due to high concentrations of certain constituents such as selenium or adverse pH levels). As part of the mine permitting process, each mine operator develops a management plan to ensure that this unsuitable material is not placed in areas where it may affect groundwater quality or revegetation success. Each mine operator also develops backfill monitoring plans as part of the mine permitting process to evaluate the quality of the replaced overburden. These plans are in place for the existing Jacobs Ranch Mine and would be developed for the North Jacobs Ranch LBA Tract if it is leased.

Development of other minerals potentially present on the Belle Ayr 2000 Tract could not occur during mining; however, development of some of these resources could occur following mining. CBM resources that are not recovered prior to mining would be irretrievably lost. The extent of the CBM resources in the tract is not known, however, Belle Ayr is currently conducting mining operations in close proximity to the Belle Ayr 2000 Tract on their adjacent existing lease. There are currently no producing oil or gas wells on the Belle Ayr 2000 Tract. One conventional oil exploration well was drilled on the Belle Ayr 2000 Tract, but it was a dry hole which never produced. There are four permitted CBM well locations on the Belle Ayr 2000 Tract, but these wells have not been drilled. As the surface owner, RAG Wyoming Land Company, Inc. has negotiated agreements with the oil and gas operator that would allow removal of any coal bed methane wells that are completed prior to mining.

4.1.3 SOILS

Under the currently approved mining and reclamation plan, Belle Ayr Mine is permitted to disturb the soil resources over the entire Belle Ayr 2000 Tract for the purpose of mining their existing adjacent coal leases. The Caballo Mine is permitted to disturb land on the east side of the Belle Ayr 2000 Tract for the purpose of mining their existing adjacent coal leases. Under the Proposed Action, approximately 118 additional acres would be disturbed for layback and overstrip to mine the Belle Ayr 2000 Tract. The reclaimed soils would have different physical, biological, and chemical properties than the premining soils. They would be more uniform in type, thickness, and texture. Average topsoil thickness would be a fairly uniform 25 inches. Soil chemistry and soil nutrient distribution would be more uniform, and average topsoil quality would be improved because soil material that is not suitable to support plant growth would not be salvaged for use in reclamation. This would result in more uniform vegetative productivity on the reclaimed land. The replaced topsoil would support a stable and productive vegetation community adequate in quality and quantity to support the planned postmining land uses (wildlife habitat, agricultural land, and rangeland).

Specific impacts to soil resources would include an increase in the near-surface bulk density of the reclaimed soil resources. As a result, the average soil infiltration rates would generally decrease, which would increase the potential for runoff and soil erosion. Topographic moderation following reclamation would potentially decrease runoff, which would tend to offset this potential increase in runoff due to decreased soil infiltration rates. The decrease in soil infiltration rates would not be permanent because revegetation and natural weathering action would form new soil structure in the reclaimed soils, and infiltration rates would gradually return to premining levels.

Direct biological impacts to soil resources would include a short-term reduction in soil organic matter, microbial populations, seeds, bulbs, rhizomes, and live plant parts for soil resources that are stockpiled before placement.

Sediment control structures are in place or would be built to trap eroded soil, revegetation would reduce wind erosion, and soil or overburden materials containing potentially harmful chemical constituents (such as selenium) would be specially handled. These measures are required by state regulations and are considered part of the Proposed Action.

4.1.4 AIR QUALITY

The Belle Ayr Mine and the Caballo Mine both maintain active Air Quality permits with the WDEQ/AQD, and are in compliance with that permit. Belle Ayr's WDEQ/AQD Permit MD-397 was approved September 13, 1999 and allows the Belle Ayr Mine to produce up to 45 mmtpy of coal. All mines are required to implement dust control practices including bag houses, covered transfer points, sprinkling of water and addition of EPA-approved chemicals to haul roads, limiting disturbance areas, and contemporaneous reclamation, and to maintain air quality monitoring networks. The Belle Ayr Mine's dust monitoring network consists of three TSP stations and two PM_{10} stations. Belle Ayr's annual monitoring data for the past three years and coal and overburden production are listed in Table 4-2.

As is shown in the table, the annual arithmetic average dust emissions from the Belle Ayr Mine were well below the permitted average of 50 $\mu g/m^3$ at the monitoring stations with coal production rates nearing 23 mmtpy. Under the Proposed Action, RAG proposes to maintain production levels at approximately 14.9 mmtpy, and no modification to the WDEQ/AQD permit would be necessary. Based only on coal production volumes, under the Proposed Action, dust emissions would be reduced. The Belle Ayr 2000 Tract has thinner overburden than the existing Belle Ayr leases which would result in a reduction of dust emissions due to less blasting and overburden handling. Additionally, the Belle Ayr 2000 Tract is located closer to the coal handling facilities at the Belle Ayr Mine than the coal in the existing Belle Ayr leases, resulting in shorter haul distances. If the Belle Ayr 2000 Tract is leased as applied for to the applicant, the life of Belle Ayr Mine would be extended by two to three years under the Proposed Action.

A surface coal mine is not a named facility under Wyoming's PSD regulations and therefore is not considered a "major emitting facility" unless it has the potential to emit 250 tons or more of any regulated pollutant. Fugitive dust emissions are not considered in determining potential to emit. Since the Belle Ayr Mine is a surface coal mine and its allowable point source PM_{10} and truck dumping TSP emission rates are estimated to be 69.0 tpy at its maximum production rate of 45 mmtpy, the mine is not considered a major emitting facility and an increment analysis under PSD regulations is not required.

Blasting is not a major source of particulate emissions at Powder River Basin mines (PM_{10} emissions inventories show that overburden and coal blasting comprise less than one percent of the total emissions). Overburden removal, wind erosion, and coal haul roads generate the majority of dust.

Table 4-2
Belle Ayr Mine
Historic Production and Air Quality Data

Year	Belle Ayr Production		Annual Arithmethic Average TSP Concentration, ($\mu g/m^3$)				Annual Arithmethic Average PM_{10} Concentration ($\mu g/m3$)		
	Coal (MMTPY)	Overburden (MMBCY)	BA-1	BA-3	BA-4	Ave	BA-5N	BA-5S	Ave
1997	22.8	60.9	41	21	54	39	15	15	15
1998	22.7	59.0	35	13	43	30	14	14	14
1999	17.9	57.3	52	23	54	43	13	12	13

As discussed in Section 3.5, there is growing public concern over the releases of NO_x from blasting, which can form a low-lying orange cloud that can be transported by wind. At a WMA sponsored symposium held in Gillette to discuss this issue on January 12 and 13, 2000, experts from industry and government agencies discussed the issue and possible causes and solutions. Some of the possible solutions being explored are improved blasting techniques or explosives and reduced powder factors. A more detailed analysis of the gases that form the clouds is also planned, which may increase understanding of the causes of the problem and suggest possible solutions. Under the Proposed Action, NO_x emissions would not be expected to increase over the existing emissions at the Belle Ayr Mine. The truck and shovel operation would continue to be used, and larger cast blasting typically associated with dragline mines would not be employed. Currently, blasts at Belle Ayr Mine are small by Powder River Basin standards, rarely exceeding 200,000 pounds. Production of NO_x clouds at Belle Ayr Mine has been rare, and they have tended to be small and dissipate rapidly. NO_x clouds have caused concern in areas that are near residences and more populated areas. The closest residence to the Belle Ayr 2000 Tract is located more than 1.5 miles away, and prevailing winds do not blow in that direction.

The Belle Ayr Mine has existing safety procedures for blasting and potential NO_x clouds that involve restricting public access using perimeter fencing and security patrols. All WDEQ/LQD requirements for blasting are strictly adhered to including blasting signs, public notice and warnings prior to shots. Under current procedures for shots close to Bishop Road, the Belle Ayr Mine uses a wind sock to determine wind direction prior to each blast. If the wind direction is toward the road, the shot is delayed or postponed until conditions are favorable. The exception to this would be if safety conditions prevail, for example if a shot is loaded and lightning threatens. In this case, traffic is stopped at points distant enough to keep the traveling public safe from the blast and potential NO_x emissions. Prior to implementing this plan, RAG reviewed it with the

Campbell County Commissioners and published it in the newspaper. Because of the remote location of the Belle Ayr 2000 Tract, and the safety precautions in effect at the adjacent mines, NO_x emissions are not anticipated to be a public safety concern as a result of mining the Belle Ayr 2000 Tract.

Air quality impacts resulting from, or associated with, mining operations would be limited primarily to the operational life of the mine. During the time the LBA tract is mined, the elevated TSP levels in the vicinity of the mining operations would continue, as would the elevated concentrations of gaseous emissions due to fuel combustion. Compliance with all state and federal air quality standards would be maintained. As with current operations, dust would be visible to the public due to mining near the current Bishop Road, which would have to be relocated to recover all of the coal in the Belle Ayr 2000 Tract.

The nearest Class I area is Wind Cave National Park in southwestern South Dakota, which is located approximately 100 miles east and slightly south of the tract. Mines are not considered to be major emitting facilities in accordance with Section 24 of WDEQ/AQD Rules and Regulations. Therefore, mines are not required by the State of Wyoming to evaluate their impacts on that Class I area. However, BLM evaluates such issues for leasing. For this EA, regional air quality impacts are evaluated in the cumulative impacts section (Section 4.5).

4.1.5 WATER RESOURCES

4.1.5.1 GROUNDWATER

Mining the Belle Ayr 2000 Tract would contribute to the impact to groundwater quantity caused by surface coal mining in two ways: 1) Mining would remove the coal aquifers and any overburden aquifers on the tract and replace them with unconsolidated spoils; and 2) water levels in the coal and overburden aquifers adjacent to the mine would continue to be depressed as a result of seepage and dewatering from the open cut on the Belle Ayr 2000 Tract. The area subject to lower water levels would be increased roughly in proportion to the increase in area affected by mining.

Mining would remove the overburden and coal aquifers on the tract, which would be replaced by an aquifer composed of backfill. After reclamation, the backfill aquifer would eventually resaturate and the discharge to Caballo Creek would be similar to premining discharges from the coal and overburden aquifers, but not for many years.

The probable hydrologic consequences of mining at Belle Ayr are discussed at length in Section 3.5.8 of the WDEQ/LQD Permit #214. Monitoring programs used to assess the probable hydrologic consequences of mining by detecting changes in the hydrologic balance are discussed in Sections 2.6 and 5.3.

The Belle Ayr 2000 Tract is surrounded on three sides by existing coal leases. Groundwater impacts of mining the existing leases at the adjacent Belle Ayr and Caballo Mines have been estimated for the coal and overburden aquifers. The Belle Ayr Mine used the USGS groundwater flow model MODFLOW (McDonald and Harbaugh, 1988) to estimate drawdowns in the area of their existing leases. Drawdowns for the Belle Ayr Mine alone, as well as cumulative mining-induced drawdowns including Belle Ayr and adjacent mines were simulated. Drawdown contour maps were constructed and have been used to predict the probable hydrologic consequences of the Belle Ayr Mine. Appendix 3.5-7 of WDEQ/LQD Permit #214 describes the development and application of the groundwater model for the Belle Ayr Mine.

At the end of 1998, the predicted five-foot coal drawdown contour extends approximately three miles north, two miles west, and two and one-half miles south of the Belle Ayr Mine permit area. Life of mine predicted drawdowns in the Wyodak-Anderson coal aquifer are shown on Figure 4-1. At the end of mining, the model-predicted five-foot drawdown contour extends beyond the permit boundary approximately five miles to the north, four miles to the west, and a maximum of 5.7 miles to the south.

Model-predicted drawdowns in the overburden aquifer at the end of 1998 are essentially contained within the Belle Ayr Mine permit boundary. The maximum extent of overburden drawdown is predicted to occur at the end of mining in 2023. At its maximum extent, the five-foot drawdown contour is approximately 1.3 miles west of the Belle Ayr permit boundary.

4.1.5.2 SURFACE WATER

Draw No. 2, an ephemeral channel, is the only native surface water body on the Belle Ayr 2000 Tract. Surface water impacts resulting from the Proposed Action would be limited to infiltration/runoff rates.

The loss of soil structure would act to increase runoff rates on 118 additional acres of disturbance after reclamation. The general decrease in average slope in reclaimed areas, discussed in Section 4.1.1, would tend to counteract the potential for an increase in runoff. Soil structure would gradually reform over time, and vegetation (after successful reclamation) would provide erosion protection from raindrop impact, retard surface flows and control runoff at approximately premining levels.

After mining and reclamation are complete, surface water flow, quality, and sediment discharge from the additional disturbance required to mine the Belle Ayr 2000 Tract would approximate premining conditions.

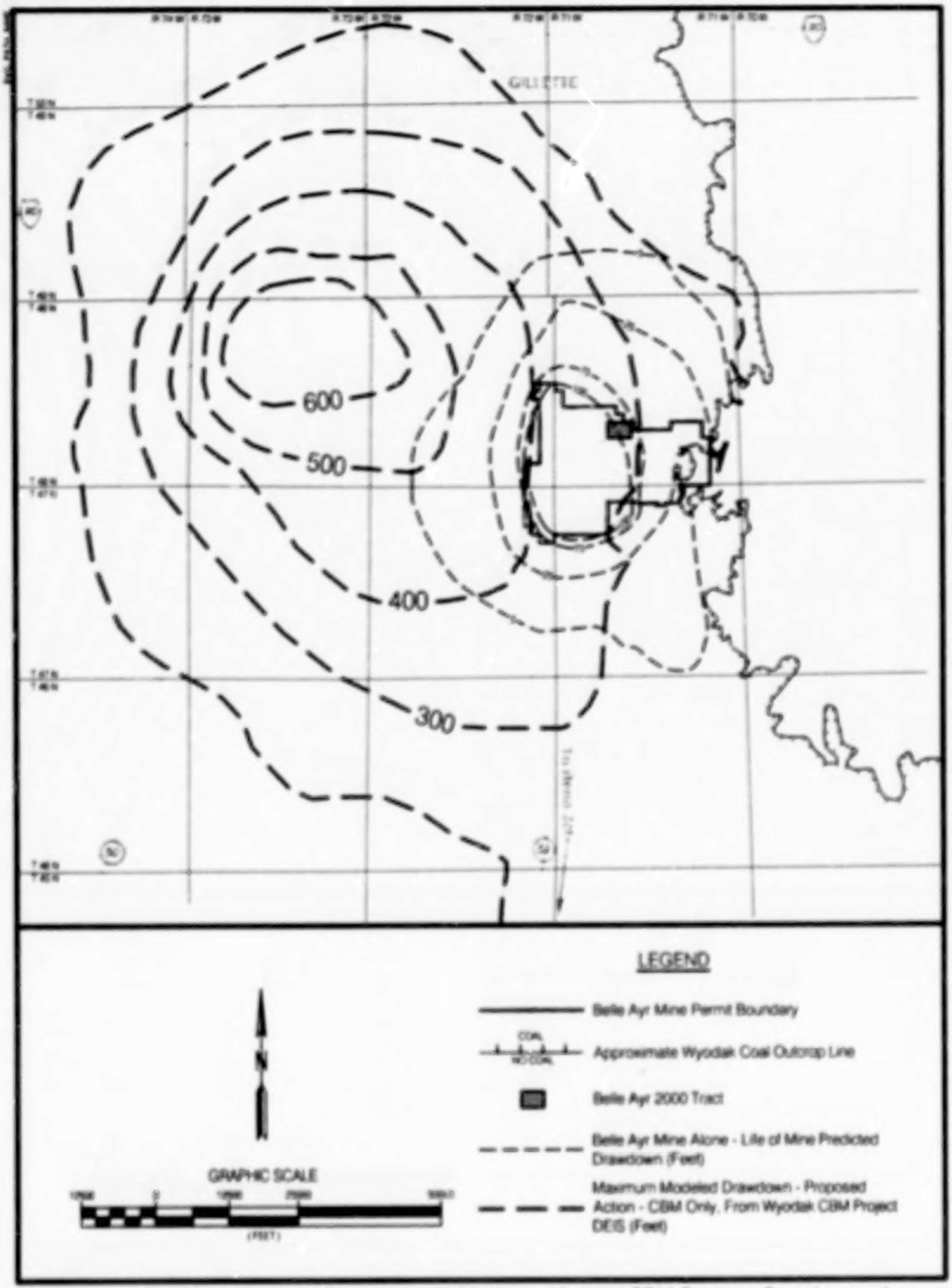
GILLETTE
600
500
400
300
LEGEND
Belle Ayr Mine Permit Boundary
COAL
NO COAL
Approximate Wyodak Coal Outcrop Line
Belle Ayr 2000 Tract
Belle Ayr Mine Alone - Life of Mine Predicted Drawdown (Feet)
Maximum Modeled Drawdown - Proposed Action - CBM Only, From Wyodak CBM Project DEIS (Feet)
GRAPHIC SCALE
(FEET)

Figure 4 - 1. Life of Mine Predicted Drawdown with Maximum Modeled CBM Contours Superimposed.

4.1.6 ALLUVIAL VALLEY FLOORS

No alluvial valley floors are present on the 118 acres of additional disturbance area required to mine the Belle Ayr 2000 Tract, therefore, no direct, indirect, or cumulative impacts are anticipated as a result of mining the LBA Tract.

4.1.7 WETLANDS

No wetlands are present on the 118 acres of additional disturbance area required to mine the Belle Ayr 2000 Tract, therefore, no direct, indirect, or cumulative impacts are anticipated as a result of mining the LBA Tract.

4.1.8 VEGETATION

As stated previously, a portion of the Belle Ayr 2000 Tract will be disturbed by the Belle Ayr Mine and the Caballo Mine as a result of mining the existing leases. Under the Proposed Action, an additional 118 acres will be stripped of topsoil and vegetation. The premining vegetation cover at the Belle Ayr 2000 Tract is comprised of agricultural crested wheatgrass or hay. Short-term impacts associated with this vegetation removal would include increased soil erosion and habitat loss for grassland wildlife and livestock. However, grassland-dependent wildlife species and livestock would benefit from the increased grass diversity, cover and production of the post-mining vegetation that would more closely match native vegetation than the existing crested wheatgrass.

Reclamation, including revegetation of these lands, would occur contemporaneously, i.e., reclamation would begin once an area is mined. Estimates of the time that would elapse from topsoil stripping through reseeding of any given area range from two to four years. This would be longer for areas occupied by stockpiles, haulroads, sediment-control structures, and other mine facilities. No new life-of-mine facilities would be located on the LBA tract under the Proposed Action, in which the LBA tract would be mined as an extension of an existing mine. Wildlife use of the area would not be restricted throughout the operations.

Re-established vegetation would be dominated by species mandated in the reclamation seed mixtures (approved by WDEQ). The majority of the approved species are native to the Belle Ayr 2000 Tract area. Initially, the reclaimed land would be dominated by upland grassland vegetation which would have greater composition and diversity than the premining agricultural vegetation. Native vegetation from surrounding areas would gradually invade and become established on the reclaimed land

Under the Proposed Action, RAG would complete mining in the Belle Ayr 2000 Tract within three years. Reclamation should be completed on the LBA tract within four years following mining. Areas occupied by topsoil stockpiles or other mining related features would be reclaimed when the features are removed.

The reclamation plans for the existing mines include steps to control invasion by weedy (invasive nonnative) plant species. The reclamation plans for the LBA Tract would also include steps to control invasion from such species.

The climatic record of the western U.S. suggests that droughts could occur periodically during the life of the mine. Such droughts would severely hamper revegetation efforts during the drought years, since lack of sufficient moisture would reduce germination and could damage newly established plants. Same-aged vegetation would be more susceptible to disease than would plants of various ages. Severe thunderstorms could also adversely affect newly seeded areas. Once a stable vegetative cover is established, however, these events would have similar impacts as would occur on native vegetation.

The potential impacts to threatened and endangered plant species are addressed in Appendix C.

4.1.9 WILDLIFE

Local wildlife populations are directly and indirectly impacted by mining. These impacts are both short-term (until successful reclamation is achieved) and long-term (persisting beyond successful completion of reclamation). The direct impacts of surface coal mining on wildlife occur during mining and are therefore short-term. They include road kills by mine-related traffic, restrictions on wildlife movement created by fences, spoil piles and pits, and displacement of wildlife from active mining areas. Displaced animals may find equally suitable habitat that is not occupied by other animals, occupy suitable habitat that is already being used by other individuals, or occupy poorer quality habitat than that from which they were displaced. In the second and third situations, the animals may suffer from increased competition with other animals and are less likely to survive and reproduce. The indirect impacts are longer term and typically include loss of carrying capacity and microhabitats on reclaimed land due to flatter topography, less diverse vegetative cover, and reduction in sagebrush density.

These impacts are currently occurring on the surrounding existing leases as mining occurs. If the LBA tract is leased under the Proposed Action, the area of mining disturbance would be extended by 118 acres and mining operations would be extended by two to three years at the Belle Ayr Mine.

Under the Proposed Action, big game would be displaced from portions of the LBA tract to adjacent ranges during mining. Pronghorn would be most affected; however there is no crucial pronghorn habitat on the LBA tract. Mule deer and white-tailed deer would not be substantially impacted, given their infrequent use of these lands and the availability of suitable habitat in adjacent areas. The displacement would be incremental, occurring over several years and allowing for gradual changes in big game distribution patterns. Big game residing in the adjacent areas could be impacted by increased competition with displaced animals. Noise, dust and associated human presence would cause some localized avoidance of foraging areas adjacent to mining activities. The Belle Ayr 2000 Tract is surrounded on three sides by existing leases, however, and big game have continued to occupy areas adjacent to and within active mine operations, suggesting that some animals may become habituated to such disturbances.

Big game animals are highly mobile and can move to undisturbed areas. There would be more restrictions on big game movement on or through the tract, however, due to additional fences, spoil piles, and pits related to mining. During winter storms, pronghorn may not be able to negotiate these barriers. WDEQ guidelines require fencing to be designed to permit pronghorn passage to the extent possible.

Road kills related to mine traffic would be extended in the area by up to three years.

After mining and reclamation, alterations in vegetative cover could cause an increase in carrying capacity and diversity from the preexisting crested wheatgrass pastureland or haymeadow. Changes in topography are not expected to be significant as the pre-mining topography is gently rolling. Sagebrush would gradually become established on the reclaimed land.

Medium-sized mammals (such as rabbits, coyotes, and foxes) would be temporarily displaced to other habitats by mining, potentially resulting in increased competition and mortality. However, these animals would quickly rebound on reclaimed areas, as forage developed and small mammal prey species recolonized. Direct losses of small mammals would be higher than for other wildlife, since the mobility of small mammals is limited and many retreat into burrows when disturbed. Therefore, populations of such prey animals as voles and mice would decline during mining. However, these animals have a high reproductive potential and tend to re-invade and adapt to reclaimed areas quickly.

No sage grouse have been observed on or near the LBA tract during annual monitoring surveys for the adjacent Belle Ayr Mine, and there is no sage grouse habitat on the existing crested wheatgrass pastureland. Thus, mining is not expected to impact sage grouse populations. The nearest sage grouse lek to the Belle Ayr 2000 Tract is located more than three miles to the south and west.

Regional raptor populations will not be deleteriously impacted by mining the LBA tract. However, individual birds or pairs may be impacted. As noted in Section 3.10.4, no raptor nests are located on the Belle Ayr 2000 Tract. Mining activity could cause raptors to abandon nests proximate to disturbance. The Belle Ayr and Caballo Mines have existing approved raptor mitigation plans. The existing Belle Ayr Mine raptor mitigation plan covers the Belle Ayr 2000 Tract. That plan, required and approved by USFWS and WDEQ/LQD, addresses the impacts of mining on nesting raptors. If the Belle Ayr 2000 Tract leased to an adjacent mine, the successful lessee would be required to revise the existing approved raptor mitigation plan to include the impacts of mining the Belle Ayr 2000 Tract. Foraging habitat for raptors would be reduced until revegetation can attract and support lagomorphs and small mammals, which serve as their prey. Raptors could be impacted by the construction or relocation of power lines, which can pose an electrocution hazard. The raptor mitigation plan includes provisions for protection from electrocution.

Displaced songbirds would have to compete for available adjacent territories and resources when their habitats are disturbed by mining operations. Where adjacent habitat is at carrying capacity, this competition would result in some mortality. Losses would also occur when habitat disturbance coincides with egg incubation and rearing of young. Impacts of habitat loss would be short-term for grassland species. Longer term impacts for tree- and shrub-dependent species are expected to be minimal due to the lack of trees and shrubs on the LBA tract.

Mining the LBA tract would have a negligible effect on migrating and breeding waterfowl as habitat is not present on the Belle Ayr 2000 Tract. Sedimentation ponds created during mining would provide interim habitat for these fauna.

No fish habitat will be impacted on the proposed lease. No perennial streams or reservoirs occur on the area. The only fish present in the Belle Ayr Mine wildlife study area are common, widespread species. Portions of the ephemeral drainage that is disturbed during mining will be restored during reclamation.

The potential impacts to threatened and endangered wildlife species are discussed in Appendix C.

Few MBHFI depend on or regularly use the proposed lease. For the most part, mining will have negligible impacts on these species of concern. A plan to monitor MBHFI and a plan to mitigate potential impacts to MBHFI is included in the existing approved Belle Ayr Mine mining and reclamation plan and addresses the Belle Ayr 2000 Tract area.

4.1.10 LAND USE

Most of the Belle Ayr 200 Tract will be disturbed when the adjacent existing leases are mined as currently permitted. Under the Proposed Action, use of the land for mining purposes would be extended for approximately three years and 118 additional acres would be disturbed. There are no producing oil and gas wells on the tract. There are four permitted CBM well locations on the Belle Ayr 2000 Tract, but these wells have not been drilled. As the surface owner, RAG Wyoming Land Company, Inc. has negotiated agreements with the oil and gas operators that would allow removal of any coal bed methane wells that are completed prior to mining.

There is no public land included in the Belle Ayr 2000 Tract. Public access to the tract is currently restricted for hunting or agricultural purposes. This would not change if the tract is leased and mined.

Following reclamation, the land would be suitable for agricultural or grazing and wildlife uses.

4.1.11 CULTURAL RESOURCES

The tract has undergone detailed cultural resource surveys and no sites eligible for the National Register of Historic places have been found on the Belle Ayr 2000 Tract. Ineligible cultural sites may be mined through.

No sites of Native American religious or cultural importance are know to occur on the Belle Ayr 2000 Tract. If such sites or localities are identified at a later date, appropriate action must be taken to address concerns related to those sites.

4.1.12 PALEONTOLOGICAL RESOURCES

No unique or significant paleontological resources have been identified on the Belle Ayr 2000 Tract, and the likelihood of encountering significant paleontological resources is small. Lease and permit conditions require that should previously unknown, potentially significant paleontological sites be discovered, work in that area shall stop and measures be taken to assess and protect the site (See Appendix B).

4.1.13 VISUAL RESOURCES

Mining activities are currently visible from Bishop Road. Mining activities on the Belle Ayr 2000 Tract would also be visible from the relocated Bishop Road.

Mining would affect landscapes classified by BLM as VRM Class IV, and landscape character would not be changed following reclamation. No unique visual resources have been identified on or near the Belle Ayr 2000 Tract.

Reclaimed terrain would be almost indistinguishable from the surrounding undisturbed terrain. Slopes might appear smoother (less intricately dissected) than undisturbed terrain to the north; however, within a few years after reclamation is completed, the mined land would not be distinguishable from the surrounding undisturbed terrain except by someone very familiar with landforms and vegetation.

4.1.14 NOISE

Noise levels on the LBA tract would be increased somewhat by coal removal activities such as blasting, loading, and hauling. Since the Belle Ayr 2000 Tract would be mined as an extension of existing operations under the Proposed Action, no rail car loading would take place on the LBA tract. The Noise Control Act of 1972 indicates that a 24-hour equivalent level of less than 70 dBA prevents hearing loss and that a level below 55 dBA, in general, does not constitute an adverse impact. OSM prepared a noise impact report for the Caballo Rojo Mine (OSM 1980) which determined that the noise level from crushers and a conveyor would not exceed 45 dBA at a distance of 1,500 ft. Explosives would be used during mining to fragment the overburden and coal and facilitate their excavation. The air overpressure created by such blasting is estimated to be 123 dBA at the location of the blast. At a distance of approximately 1,230 ft, the intensity of this blast would be reduced to 40 dBA. The nearest occupied dwelling is over 1.5 miles away from the LBA tract.

Because of the remoteness of the site and because mining is already ongoing in the area, noise would have little off-site effect. Wildlife in the immediate vicinity of mining may be adversely affected; however, observations at other surface coal mines in the area indicate that wildlife generally adapt to increased noise associated with active coal mining. After mining and reclamation are completed, noise would return to premining levels.

4.1.15 TRANSPORTATION FACILITIES

No new transportation facilities would be required under the Proposed Action; however, Bishop Road would have to be relocated. Traffic to and from the Belle Ayr Mine would continue at existing levels for an additional two or three years. Essentially all of the coal removed would be transported by rail, and leasing the LBA tract would extend the length of time that coal is shipped from the permitted Belle Ayr Mine.

The active underground telephone line and overhead power line that cross the Belle Ayr 2000 Tract would have to be moved. Relocation of the phone line would be handled according to specific agreements between RAG and the telephone line owner. The overhead power line is owned by RAG and is used for mining purposes.

4.1.16 SOCIOECONOMICS

If the applicant is the successful bidder on the Belle Ayr 200 Tract, mining the tract would extend the life of the already permitted Belle Ayr Mine by two to three years.

Coal prices are currently projected to remain relatively constant throughout the life of the mine (WSGS 1999). Assuming a price of $3.50 per ton, the revenue from the sale of the estimated 29 million tons of recoverable coal from the LBA tract would total $101.5 million for the Proposed Action. Some of this money from the sale of this federal coal would be paid to federal, state and local governments in the form of taxes and federal production royalties, as discussed below.

The federal government would collect a royalty at the time the coal is sold. This royalty is 12.5 percent of the sale price of the coal. Using the above assumptions of recoverable coal and coal price, this would amount to approximately $12.7 million. This money would be split equally between the state and federal governments. The federal government would also collect black lung and reclamation taxes based on the sale of the coal.

According to a study done by the University of Wyoming (UW 1994), the State of Wyoming received about $1.10 per ton from the sale of Powder River Basin coal produced in 1991. The taxes and royalties included in this calculation were severance taxes, ad valorem taxes, sales and use taxes, and the state's share of federal royalty payments on production (discussed above). Under this scenario, the estimated total direct return to the State of Wyoming from the production of this federal coal, in current dollars, would be $31.9 million under the Proposed Action. This figure includes half of the federal royalty discussed above.

The federal government also receives a bonus payment at the time the federal coal is leased. Bonus payments on the federal coal leases issued in the Powder River Basin since 1990 have ranged from 11.1 cents per ton to 38.3 cents per ton. This would represent a potential bonus payment range of $3.2 million to $11.1 million for the estimated federal coal tonnage included in the Belle Ayr 2000 Tract. The actual amount the federal government would receive would depend on the actual bonus bid if the tract is leased. The bonus payment would be payable over five years and would be divided equally with the State of Wyoming.

RAG does not anticipate that leasing and mining the Belle Ayr 2000 Tract would affect total employment at the Belle Ayr Mine. As a result, no additional demands on the existing infrastructure or services in the nearby communities would be expected because no influx of new residents would be needed to fill new jobs. The economic stability of the communities of Gillette and Wright would benefit by having the Belle Ayr Mine employees living in their communities employed for an additional 2 to 3 years.

Issues relating to the social, cultural, and economic well-being and health of minorities and low-income groups are termed Environmental Justice issues. In reviewing the impacts of the Proposed Action on socioeconomic resources, surface water and groundwater quality, air quality, hazardous materials, or other elements of the human environment in this chapter, it was determined that potentially adverse impacts do not disproportionately affect Native American tribes, minority groups and/or low-income groups.

With regard to Environmental Justice issues affecting Native American tribes or groups, the general analysis area contains no tribal lands or Native American communities, and no treaty rights or Native American trust resources are known to exist for this area.

Implementing any of the alternatives would have no effects on Environmental Justice issues, including the social, cultural, and economic well-being and health of minorities and low income groups within the general analysis area.

4.1.17 HAZARDOUS AND SOLID WASTE

If Belle Ayr 2000 tract is leased as applied for, the wastes that would be generated in the course of mining the tract would be similar to the wastes that are currently being generated by the adjacent existing mining operations. Wastes generated by mining the LBA tract would be handled in accordance with the existing regulations using the procedures currently in use at the adjacent Belle Ayr and Caballo Mines.

4.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Belle Ayr 2000 coal lease application would be rejected and the area contained in the application would not be offered for lease at this time. For the purposes of this analysis, the No-Action Alternative assumes that these lands would never be mined. However, the approved mining operations for the existing adjacent Belle Ayr and Caballo Mines would not be changed if this alternative is chosen. Because of the existing approved use of the majority of the Belle Ayr 2000 Tract as mining support, the major difference between the Proposed Action and the No Action Alternative lies in the removal of the coal included in the tract and the impact to an additional 118 acres of surface.

The impacts described on the preceding pages to topography and physiography, geology and minerals, soils, air quality, water resources, alluvial valley floors, wetlands, vegetation, wildlife, threatened, endangered and candidate species, land use and recreation, cultural resources, Native American concerns, paleontological resources, visual resources, noise, and transportation would occur on the existing Belle Ayr and Caballo coal leases under the No-Action Alternative.

The economic benefits that would be derived from mining the LBA tract during an additional two to three years of mining would be lost. Not leasing this tract at this time could result in a bypass of this federal coal if the lease is not sold while one of the existing adjacent mines is still in operation and in a position to economically recover the coal included in the tract. As discussed in Chapter 2, coal production at the Belle Ayr Mine would be expected to decrease under the No Action Alternative because operations at the mine are moving into areas of increasing overburden thickness, and the capacity to remove overburden is limited by the capacity of the existing truck and shovel fleets. With this fixed overburden removal capacity, coal production at the Belle Ayr Mine would decline as the stripping ratio increases. RAG has recently announced layoffs and plans to reduce production in 2001 at the Belle Ayr and Eagle Butte Mines. Additional decreases in coal production could result in additional decreases in employment.

4.3 REGULATORY COMPLIANCE, MITIGATION AND MONITORING

In the case of surface coal mining, SMCRA and state law require a considerable amount of mitigation and monitoring. Measures that are required by regulation are considered to be part of the Proposed Action. These requirements, mitigation plans, and monitoring plans are in place for the No-Action alternative, as part of the current approved mining and reclamation plan for the existing Belle Ayr Mine, which includes all of the Belle Ayr 2000 Tract. The major mitigation measures and monitoring measures that are required by state or federal regulation are summarized in Appendix D. Some of these mitigation and monitoring measures are also described in the resource discussions in Section 4-1 of this document.

If impacts are identified during the leasing process that are not mitigated by existing required mitigation measures, BLM can include additional mitigation measures, in the form of stipulations on the new lease, within the limits of its regulatory authority. In general, the levels of mitigation and monitoring required for surface coal mining by SMCRA and Wyoming state law are more extensive than those required for other surface disturbing activities; however, concerns are periodically identified that are not monitored or mitigated under existing procedures. One issue of current concern is the release of NO_x from blasting, and the resulting formation of low-lying orange clouds that can be carried outside the mine permit areas by wind. As a result of this concern, industry and agency representatives have met and discussed possible causes and solutions. These included improving blasting techniques or explosives, reducing powder factors and analyzing the composition of the NO_x clouds. These procedures are being evaluated. BLM is not involved in the regulation of blasting activities at the coal mines in the Powder River Basin; however, BLM supports the continuing efforts of the involved regulatory agencies to develop appropriate procedures and techniques to resolve this problem.

The BLM has not identified additional special stipulations, beyond those listed in Appendix B, that should be added to the BLM lease or areas where additional or increased monitoring measures are recommended.

4.4 RESIDUAL IMPACTS

Residual impacts are unavoidable impacts that cannot be mitigated and would therefore remain following mining and reclamation.

Topographic moderation is a permanent consequence of mining. The indirect impacts of topographic moderation on wildlife habitat diversity would also be considered permanent.

Geology from the base of the coal to the surface would be subject to significant, permanent change.

Existing soils would be mixed and redistributed, and soil-forming processes would be disturbed by mining. This would result in long-term alterations.

The area where groundwater drawdowns and replacement of coal and overburden with spoils occur would be slightly increased under the Proposed Action compared to what would occur without the addition of the LBA tract. This would increase the time it would take for the postmining backfill in the area of the Belle Ayr Mine to reach equilibrium water levels and water quality. Less time would be required near the mining boundaries. Water level and water quality in the backfill would be suitable to provide water to wells for livestock use, but would be different from premining conditions.

Reclaimed vegetative communities may never completely match the surrounding native plant community.

Because of the existing gently rolling topography and premining agricultural use of the Belle Ayr 2000 Tract, no residual impacts to wildlife are anticipated.

There would be no expected residual impacts to air quality; alluvial valley floors; wetlands; threatened, endangered, or candidate plant or animal species; land use; recreation; cultural resources; Native American concerns; paleontological resources; visual resources; noise; transportation facilities; or socioeconomics.

4.5 CUMULATIVE IMPACTS

Cumulative impacts result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions, regardless of who is responsible for such actions. Cumulative impacts can result from individually minor, but collectively significant, actions occurring over time.

This section briefly summarizes the cumulative impacts that are occurring as a result of existing development in the area being mined and considers how those impacts would change if the Belle Ayr 2000 Tract is leased and mined and if other proposed development in the area occurs.

Points to keep in mind include: 1) the total areas of all mines would not be disturbed at once; 2) the number of acres, type of vegetation, etc., disturbed would vary from year to year; 3) the impacts to groundwater would vary as mining progresses through each permit area (depending on saturation, how close the next mine pit is, etc.); and 4) the intensity and extent of CBM development is somewhat speculative.

Since decertification of the Powder River Federal Coal Region in 1990, the Wyoming State Office of the BLM has held 13 competitive coal lease sales and issued 10 new federal coal leases containing approximately 2.64 billion tons of coal using the LBA process (Table 1-1). This leasing process has undergone the scrutiny of two appeals to the Interior Board of Land Appeals and one satisfactory audit by the General Accounting Office.

The Wyoming BLM currently has pending applications for eight additional federal coal tracts, including the Belle Ayr 2000 Tract, containing about 2.3 billion tons of coal (Table 1-2). All eight of the applications are for maintenance tracts for existing mines, and all eight pending applications have been reviewed by the RCT and have been recommended for processing.

BLM also completed one exchange in the Powder River Basin, authorized by Public Law 95-554 in 2000. Under this exchange, EOG Resources (formerly Belco) received a federal lease for a 106-million ton portion of the Hay Creek Tract adjacent to the Buckskin Mine in exchange for the rights to a 170-million ton coal lease near Buffalo, Wyoming that is unmineable due to construction of Interstate Highway 90.

The Wyoming and Montana BLM state offices completed a study entitled "*Powder River Basin Status Check*" in 1996. The purpose of this study was to document actual mineral development impacts in the Powder River Basin from 1980 to 1995 and compare them with mineral development impacts that were predicted to occur by 1990 in the five previously prepared Powder River Basin regional EIS's. Portions of the status check were updated prior to the 1997 and 1999 RCT public meetings in Casper, Wyoming and Billings, Montana.

Four of the previously prepared regional EIS's evaluated coal development in the Powder River Basin in Wyoming. They are:

90

Final Environmental Impact Statement, Eastern Powder River Coal Basin of Wyoming, BLM, October 1974;

Final Environmental Statement, Eastern Powder River Coal, BLM, March 1979;

Final Environmental Impact Statement, Powder River Coal Region, BLM, December, 1981; and

Draft Environmental Impact Statement, Round II Coal Lease Sale, Powder River Region, BLM, January 1984.

For Wyoming, the status check compared actual development in Campbell and Converse counties with predictions in the 1979 and 1981 Final EIS's, and USGS Water Resources Investigations Report 88-4046, entitled "*Cumulative Potential Hydrologic Impacts of Surface Coal Mining in the Eastern Powder River Structural Basin*" (Martin, et al., 1988), which is frequently referred to as "the CHIA."

Since 1989, coal production in the Powder River Basin has increased by an average of 6.8 percent per year. The increasing production is primarily due to increasing sales of low-sulfur, low-cost Powder River Basin coal to electric utilities who must comply with Phase I requirements of Title III of the 1990 Clean Air Act Amendments. Electric utilities account for 97 percent of Wyoming's coal sales.

The status and ownership of currently operational mines in Campbell and northern Converse Counties are shown in Table 4-3. There have been numerous changes in mine ownership during the last decade, and this has resulted in mine consolidations and mine closings within the basin.

The mines are located just west of the outcrop of the Wyodak coal, where the coal is at the shallowest depth. The mines in Campbell and Converse counties produce 85 to 95 percent of the coal produced in Wyoming each year. Table 4-4 summarizes predicted coal mining activity (from the 1979 and 1981 regional EIS's) with actual activity that has occurred since the EIS's were prepared.

Campbell and Converse counties' oil production decreased to 17.9 million barrels of oil in 1999 from 32.8 million barrels in 1992, a 45% decrease. The recent sharp increase in oil prices may help sustain current production rates. It is unclear if this increase in prices will be sustained long enough to result in an increase in oil production in the foreseeable future.

Natural gas production has been increasing, particularly in Campbell County, due to the

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Table 4-3
Status of Wyoming Powder River Basin Coal Mines

		Coal Production[1]			Coal Production[1]		
1999 Mine	**1994 Mine Operator**	**1993 Actuals[3]**	**1994 Permitted[4]**	**1999 Mine Operator**	**1999 Actual[3]**	**2000 Permitted[4]**	**Status/Comments**
Buckskin	SMC (Zeigler)	11.18	24.0	Vulcan Coal	15.59	22.0	Active
Clovis Point	Kerr-McGee	0	4.0	Wyodak Resources	0	4.0	Mine shut down/leases relinquished or sold; facilities sold; Wyodak has AQD permit
Dry Fork	Phillips/WFA	3.28	15.0	WFA	1.22	15.0	Active
Eagle Butte	Cyprus-Amax	16.70	29.6	RAG Coal West, Inc.	17.42	35.0	Active
Fort Union	Fort Union Ltd	0.06	9.3	Kennecott/Kfx	0.03	9.4	Active
Rawhide	Carter (Exxon)	9.86	24.0	Peabody	0.81	24.0	Shut down
Wyodak	Wyodak Resources	3.03	10.0	Wyodak Resources	3.18	10.0	Active
NORTHERN MINE GROUP TOTALS		**44.11**	**115.9**		**38.25**	**119.4**	
Belle Ayr	Cyprus-Amax	15.59	25	RAG Coal West, Inc.	17.89	45	Active
Caballo/N. Caballo	Carter (Exxon)/ Western Energy	15.42	40	Peabody	26.47	40	Active/Caballo Mine + former Rocky Butte & West Rocky Butte leases
Cordero Rojo	Kennecott/Drummond	21.01	44	Kennecott	45.67	65	Active/Cordero + Caballo Rojo Mines
Coal Creek	ARCO	0.11	18	Arch	11.23	18	Active/Under Temporary Cessation of Operations
CENTRAL MINE GROUP TOTALS		**52.13**	**127**		**101.26**	**168**	
Antelope	Kennecott	7.29	12	Kennecott	22.69	30	Active
Black Thunder	ARCO	34.32	36	Arch	48.67	100	Active
Jacobs Ranch	Kerr-McGee	18.39	25	Kennecott	29.06	50	Active
N. Antelope/Rochelle	Peabody	32.94	50	Peabody	68.87	75	Active/North Antelope Mine + Rochelle Mine
N. Rochelle	SMC (Zeigler)	0.02	8	Vulcan Coal	8.17	35	Active/facilities constructed in 1998-99
SOUTHERN MINE GROUP TOTALS		**92.96**	**131**		**177.48**	**290**	
TOTALS FOR 3 MINE GROUPS		**189.2**	**373.9**		**316.99**	**577.4**	

[1] Actual production (million tons) on left, permitted production (million tons) on right.

[2] Source: Wyoming State Geological Survey *GEO-NOTES*, August 1994.

[3] Source: *COAL OUTLOOK SUPPLEMENT*, August 9, 1999 and Wyoming State Inspector of Mines *ANNUAL REPORT* for 1999.

[4] Source: Judy Shamley, WDEQ/AQD. Figures are permitted capacity as of October 1, 2000.

Table 4-4
Coal Production and Development Levels Campbell and Converse Counties, Wyoming

	Coal Production (Million Tons)	Number of Active Coal Mines	Number of Existing Power Plants	Number of Active Coal Enhancement Facilities	Direct Coal Employment	Average Price-NE Wyoming
1979 Predictions for 1990	174.3	15	2	1	3,889	na
1981 Predictions for 1990	318.4	37	3	1	11,900	na
Actual 1990	162.6	18	3	1	2,862	$6.86
Actual 1994	216.9	19	4	1	3,126	$5.62
Actual 1995	246.5	19	4	1	3,177	$5.60
Actual 1996	261.1	18	4	2	3,274	$5.40
Actual 1997	264.1	18	4	2	3,164	$5.03
Actual 1998	297.5	16	4	2	3,348	$4.73
Actual 1999	319.9	15[1]	4	2	3,362	$4.66

Existing Power Plants: PP&L Dave Johnson, PP&L Wyodak, Black Hills Simpson #1, and Black Hills Simpson #2

Proposed New Power Plants NAPG Two Elk, Calpine and Black Hills Wygen #1

Existing Coal Enhancement: ENCOAL-Buckskin (inactive), KFx-Fort Union (active), and Wyodak Earthco (active)

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[1] Includes the Dave Johnson Mine, which is not included in Table 4-3.

Sources: 1979 and 1981 BLM Powder River Basin Regional EISs, Wyoming State Geological Survey Geo-notes-1996-99, and Wyoming State Inspector of Mines Annual Reports, 1990-99, development of shallow CBM resources west of the coal mines. CBM exploration and development is currently ongoing throughout the Powder River Basin in Wyoming, and it is estimated that as of October 2000, there were more than 5,000 potentially productive wells in place. Since the early 1990s, the Wyoming BLM has completed numerous EAs and two EISs analyzing proposed CBM projects. The most recent EIS, the Wyodak CBM Project EIS, was completed in 1999. The Wyodak EIS project area included 3,600 square miles of mixed federal, state and private lands. The EIS analyzed the impacts of drilling and producing up to 5,000 new federal, state, and private CBM wells in addition to the 890 wells that had been evaluated in previous NEPA documents. BLM is currently preparing an EA to analyze the impacts of drilling as many as 2,500 federal drainage protection wells within the Wyodak CBM project area. These wells would be drilled and produced to prevent the loss of federal CBM resources and corresponding royalties from undrilled federal oil and gas leases that are adjacent to and potentially being drained by wells drilled on private or state oil and gas leases. Wyoming BLM is also preparing an EIS to analyze the cumulative impacts of reasonably foreseeable CBM, conventional oil and gas, and other mineral development impacts withing the Wyoming portion of the Powder River Basin. The EIS will analyze the potential impacts of proposed additional CBM development in the Wyoming portion of the basin and update the BLM planning documents in the area of CBM development interest. The regional coal EIS's (BLM 1974, 1979, 1981, 1984) and the Buffalo RMP (BLM 1985) analyzed oil and gas development, but did not anticipate that the oil and gas development would include production of CBM resources.

Under the current process for approving CBM drilling, CBM wells can be drilled on private and state oil and gas leases after approval by the Wyoming Oil and Gas Conservation Commission and the Wyoming State Engineer's Office. On federal oil and gas leases, BLM must analyze the individual and cumulative environmental impacts of all drilling, as required by NEPA, before CBM drilling on the federal leases can be authorized. Approximately 88% of the coal rights in the Wyodak CBM project area are federal, but only about half of the oil and gas rights in this area are federal. A June 7, 1999 Supreme Court decision (98-830) assigned the rights to develop CBM on a piece of land to the owner of the oil and gas rights.

Other mineral development levels in the Wyoming Powder River Basin are currently lower than predicted in the EIS's. In the 1970's, significant uranium development was anticipated in southwest Campbell County and northwest Converse County. This development did not materialize because the price of uranium dropped in the early 1980's. There are currently two *in situ* uranium operations in Converse and Johnson counties, but no mines and no mills. There were three active *in situ* operations in the Powder River Basin in 1999, but one of them, located in southeastern Johnson County, has since ceased operations. Uranium production has been increasing in recent years, but is expected to decrease this year because prices are decreasing due to international purchases of Russian uranium from stockpiles and decommissioning of uranium-based weapons (WSGS 2000).

Scoria is quarried for use as road surfacing material, primarily by coal mines but also by a few excavation and construction firms. Bentonite is mined in parts of the Wyoming Powder River Basin, but not in Campbell or Converse Counties.

The proposed Belle Ayr 2000 Tract is situated within a nearly continuous corridor of four coal mines (counting the Cordero/Rojo Complex as one mine) (see Figure 1-2). This central Campbell County mine corridor is approximately 20 miles long and eight miles wide. The current maximum permitted production rate for these five mines is 168 million tons per year (Table 4-3). Only one LBA, the West Rocky Butte LBA, including approximately 463 acres of federal coal, has been issued to mines in this central group since decertification. There is one other pending maintenance lease in the central group of mines, the Belle Ayr 1997 Tract.

CBM wells have been producing west of the central group of mines since 1992. CBM drilling and production is expected to continue in the areas around the coal mines, and on the LBA's. Due to the proximity of the coal mining and CBM production operations, cumulative impacts to groundwater, surface water, air quality and wildlife are likely to occur as more CBM resources are developed west of the central mine group. These potential impacts are discussed in the following cumulative impact discussion for these resources.

In addition to the ongoing coal mining and leasing and the CBM development, three other projects are currently in progress or planned in the general vicinity: 1) construction and operation of the Two Elk Power Plant east of the Black Thunder Mine; 2) construction of the Wygen #1 power plant which has been proposed at the Wyodak Mine site; and 3) construction and use of the proposed DM&E rail line. These projects are considered in this cumulative impact discussion because, due to their locations, the impacts from these projects could overlap with the impacts of mining the Belle Ayr 2000 Tract. A fourth project, the ENCOAL facility, which at one time was scheduled for construction at the North Rochelle Mine, has been indefinitely delayed.

Two Elk would be a coal-fired power plant located east of Black Thunder Mine and would generate 250 Mw. The plant would burn low-Btu "waste coal" and coal fines from nearby mines as well as sub-bituminous coal in a pulverized coal boiler. This ability to burn low Btu waste coal and fines would allow the Two Elk plant to recover fuel values that might otherwise be lost and thereby generate electric power more efficiently than existing coal-fired plants. Coal and waste coal would be transported from the mine to the power plant by direct truck haul on unpaved roads, and ash would be returned to the mine by enclosed, 4-wheel off-highway trucks. An application for an air quality Permit to Construct was submitted to WDEQ and was deemed administratively complete on August 5, 1997. The Two Elk project received a Permit to Construct from WDEQ/AQD on February 27, 1998. On February 17, 2000 the applicant was granted a permit modification by WDEQ/AQD. The modification allows for relocation of the plant based on soils and geotechnical considerations and also changes the original power plant design. The permittee has two years from the date of issuance to begin construction. No final decisions have been made as to how much water would be used, or where it would be obtained. Various scenarios for "wet" and "dry" operations are being evaluated at this time. Other permits that will be obtained include a wastewater permit from WDEQ and various construction and waste disposal permits from the state and county. An EIS will also be necessary to address the transmission line and access road, which both cross lands under USFS jurisdiction. According to a recent article in the *Gillette News-Record*, construction could begin on the plant site in 2001 (*Gillette News-Record* 2000c).

The Wygen #1 will be a 80 Mw coal-fired power plant at the Black Hills Power and Light Company Energy Complex located near the Wyodak Mine. Wygen #1 will burn approximately 500,000 tons of coal per year produced at the Wyodak Mine. Wygen #1 will use air-cooled condensing technology, limiting water use. No additional support or facilities will be constructed with the Wygen #1 plant. Black Hills Power and Light Company estimates that an additional 300 people will be employed during the peak construction phase, and that the plant will be operational by 2003.

The Surface Transportation Board preliminarily approved the DM&E Railroad expansion plan (to build 262 miles of new track in the Powder River Basin and to rehabilitate 650 miles of track across South Dakota and Minnesota) on December 11, 1998. The approval was made pending the completion of an analysis of the environmental impacts of the project. The DM&E had proposed to start construction in 1999 and complete the new railroad line in 2001; however, final approval and construction cannot take place until after the environmental analysis is completed. The proposed route in Wyoming will generally follow along the Cheyenne River valley. A draft EIS has been prepared and is available for public review.

With the exception of some projected impacts to the labor and housing markets, none of the impacts to the physical environment projected by these projects would extend into the Belle Ayr 2000 analysis area. The DM&E railroad line could extend along the eastern side of the Belle Ayr Mine.

The status check identified one part of the coal mining process where the actual levels of development did not agree with the predictions, and this was the number of acres reclaimed. In general, coal mine reclamation efforts have been successful in both the Wyoming and Montana portions of the basin; however, as indicated in Table 4-5, the regional EIS's assumed that reclamation would proceed at a faster pace than has actually occurred.

Table 4-5
Predicted and Actual Coal Mine Disturbance and Reclamation
Campbell and Converse Counties, Wyoming

Year	Surface Coal Mining Disturbance (Acres)*	Surface Coal Mining Reclamation (Acres)**	Percent Reclaimed
1979 EIS Prediction for 1990	22,794	12,666	55.57%
1981 EIS Prediction for 1990	48,400	34,100	70.45%
Actual 1990	31,797	6,994	22.00%
Actual 1996	47,018	12,165	25.87%
Actual 1999/2000***	56,737	16,868	29.73%

* Includes all disturbance, including Mine facilities, rail facilities, roads, sedimentation ponds, etc.

** Includes only acres seeded with permanent seed mixture, not all acres currently being reclaimed.

*** Based on recent Annual Reports submitted to WDEQ/LQD that are available for each Mine, compiled by Mark Humphries, OSM.

Table 4-5 compares the 1979 and 1981 predictions of surface coal mining disturbance and reclamation areas with actual disturbance and reclamation areas. The numbers are not directly comparable because the 1979 and 1981 EIS estimates excluded acres of disturbance occupied by mine facilities but the actual numbers that are reported include acres of disturbance occupied by mine facilities. To make them more comparable, the number of actual disturbed acres would be decreased to reflect the acres at each mine occupied by mine and rail facilities, roads, etc.; however those numbers have not been available for all mines in the annual reports. Also, since reclamation is a process involving many steps, and seeding with the final seed mixture happens near the end of the process, Table 4-5 shows the area that is currently almost completely reclaimed but it does not show the total number of acres that are being reclaimed at this time.

The development of reclamation schedules for Powder River Basin mines must take into account various unique factors:

- Very thick coal seams;
- Diverse premining topography;
- Surface-mining methods using trucks and shovels combined with draglines; and
- Large-volume material movements.

These factors affect the amount of reclamation that can be accomplished at any given time.

Achievement of final postmine topography immediately following mining is not always possible. The mining plan dictates the backfill placement and timing sequence and must take into account changing strip ratios which create material surpluses or deficits. Stockpiling, which may be required to fill final pit voids or store new pit boxcut material, affects the backfill material balance. Operating changes can also affect the backfill placement timing and sequence. Some examples include changing the pit direction to conform to lease configuration, changing plans to accommodate production growth and changes in technology or mining method. The achievement of contemporaneous reclamation is evaluated on a site-by-site basis by the WDEQ taking the mining complexities unique to each mine into account.

Currently, WDEQ/LQD suggests to operators that only large, contiguous areas such as drainage basins be considered for bond release, with the assurance that the area will not be disturbed in the future. Because many mine plans cross a drainage basin several times during the life of mine, final reclamation of the drainage may not occur until late in the life of mine. This issue is further complicated when two operators are mining in the same drainage on different reclamation schedules, in that bond release for the first operator to mine the basin could be held until the second operator's portion of the basin is reclaimed. Due to the uncertainties involved the process of applying for and receiving final bond release, most companies are electing to postpone the initiation of bond release until late in the life of mine.

At Belle Ayr Mine, approximately 170 acres were disturbed in 1999 and 150 acres were permanently reclaimed. Cumulatively through 1999, a total of 4,366 acres had been disturbed at Belle Ayr Mine and approximately 35 percent of that disturbance (1,510 acres) has been permanently reclaimed. At the Caballo Mine, the most recently available annual report indicated that about 4,348 cumulative acres have been disturbed and approximately 33 percent of that disturbance (1,427acres) has been permanently reclaimed.

4.5.1 TOPOGRAPHY AND PHYSIOGRAPHY

Following surface coal mining and reclamation, topography will be modified in an elongated corridor east of and paralleling Highway 59 from just north of Gillette, Wyoming, south for about 75 miles. The topography in the Powder River Basin is characterized by relatively flat or rolling topography. After reclamation, these characteristics will be emphasized in the reclaimed area. Premining features that were more topographically unique (e.g., steeper hills and gullies, rock outcrops, etc.) will generally be smoothed. The reduction in topographic diversity may lower the carrying capacity for big game in the reclaimed areas; however, big game ranges are generally very large and mining activities are, in general, not located in habitats defined as crucial. The overall flattening and lowering of the topography would result in increased infiltration of surface water and reduced peak flows from the drainages. The streams typically flow from west to east across the area rather than north to south along the entire corridor. Therefore, only a small part of each stream's drainage area would be disturbed (see Section 4.5.5). CBM development, and the proposed construction of the railroad line and Two Elk power plant would cause minimal topographic and/or physiographic changes.

4.5.2 GEOLOGY

The Powder River Basin coal region encompasses an area of about 20,000 mi^2 and contains nearly 240 billion tons of sub-bituminous coal resources (BLM 1979). Converse County has a total area of 4,050 mi^2 of which slightly less than one percent is within current permit boundaries. Campbell County has a total area of about 4,760 mi^2, of which approximately four percent is within current mine permit boundaries. Coal mining in this area disturbs about 2,000 acres annually with about 1,850 acres reclaimed annually (BLM 1996g). Mining and reclamation rates are expected to continue to increase through the year 2015, but the balance between reclamation and mining should remain about the same. In the Powder River Basin, the coal reserves currently leased represent a small percentage of the total coal reserves but a large percentage of the shallowest (hence the most economical to recover) coal reserves.

Under the Proposed Action, approximately 244 additional acres of federal coal would be leased, which would represent an increase of less than 1% in the area of leased federal coal in the central group of mines.

Coal and CBM are non-renewable resources that form as organic matter decays and undergoes chemical changes over geologic time. The coal resources and CBM that are removed would be used to generate power and would not be available for use in the future. Based on the information that is currently available, removal of the CBM and water from the coal prior to mining it does not damage the coal. Construction of the proposed railroad line and power plants would not impact the geology or mineral resources in the area, so there would be no overlapping impacts related to these projects.

4.5.3 SOILS

The anticipated disturbance of 118 additional acres of soils under the Proposed Action is only a 1.4 percent addition to the already approved disturbance area of 8,441 acres expected for the existing Belle Ayr Mine, and is a minimal addition to the combined disturbance of the active mines in this area. Replaced topsoil would support a stable and productive native vegetation community adequate in quantity and quality to support planned postmining land uses such as wildlife habitat and rangeland.

Additional soil disturbance will occur with the proposed CBM development west of the mines and with construction of the proposed power plants.

4.5.4 AIR QUALITY

According to current regulatory standards by which air quality is defined, surface mining and CBM development in the Powder River Basin have not resulted in impacts to air quality that have exceeded federal or state standards.

Based on predictive models conducted for Powder River Basin mines, mining operations do not have significant off-site particulate pollution impacts, even when production and pollution from neighboring mines are considered. However, this prediction has been based on the assumptions that mining activities are sufficiently removed from the permit boundaries and that neighboring mines are not actively mining in the immediate vicinity (within 0.6-2.5 miles). Previous modeling (BLM 1992a) has shown that incremental particulate pollution impacts decrease to insignificant levels (< 1 $\mu g/m^3$ PM_{10} annual average) within six miles of active mining.

In cases where mines are in close proximity (within two miles), WDEQ follows a modeling protocol which accounts for all mine-generated particulate air pollutants from all nearby mines to determine impacts to ambient air quality. Known as the "Mine A/Mine B" modeling procedure, this model evaluates the total impacts of a given mining operation, including those impacts from and on neighboring mines. In past modeling conducted in support of Belle Ayr Mine's air quality permit, Mine A/Mine B analyses have been conducted. Under the Proposed Action, no modifications to the existing air quality permit for Belle Ayr Mine would be required as coal production will not increase to the permitted volume, operational equipment will not change, and no new point sources will be constructed.

Several regional cumulative air quality impact analyses have been performed as part of EISs analyzing development in the Wyoming Powder River Basin. In 1999, a far-range cumulative air quality modeling analysis was performed for the Wyodak CBM Project DEIS. The Wyodak DEIS analysis estimated impacts on air quality in the year 2015 from projected mining levels other reasonably foreseeable actions including existing coal leases and pending LBA's, the ENCOAL Plant, the DM&E railroad line, the Two Elk Power Plant, and the proposed coal bed methane production. This analysis was updated and modified for the Horse Creek Coal Lease Application DEIS. The Belle Ayr 1997 Tract was included in the cumulative impact analysis prepared for the Horse Creek DEIS as one of the reasonably foreseeable actions. Subsequent to that analysis, RAG modified the Belle Ayr 1997 application and applied for the Belle Ayr 2000 Tract. The cumulative air quality impacts were further updated in the recently released DEIS for the DM&E Railroad Powder River Basin Expansion Project.

The results of the Horse Creek DEIS cumulative air quality analysis are summarized in the table and figures included in Appendix E . The cumulative air quality impact analysis indicates that impacts in Class I and sensitive Class II areas, based on reasonably expected pollutant emission increases through the year 2015, will be quite small with the exception of impacts on visibility. The model results suggest that visibility impacts may exceed Limits of Acceptable Change (LACs) on some days in all areas evaluated. The LACs for visibility impacts, as well as those for other AQRVs, are not regulatory limits, but represent federal land manager policies for evaluating impacts.

The Wyodak and Horse Creek analyses assumed that coal production in 2015 would be approximately 82 percent of the currently permitted production levels, based on the coal demand levels projected for 2015 by Resource Data International. For the Belle Ayr Mine, the permitted production level is 45 million tons of coal per year, and the production level projected for 2015 in the cumulative air quality model was 36.9 million tons. In 1999, the mine produced 17.9 million tons. RAG expects to ship about 15.4 million tons in 2000, and projects it will ship 9.4 million tons in 2001.

No change to long-term cumulative air impacts are anticipated if the Belle Ayr 2000 Tract is leased and mined as a maintenance tract for and existing mine. No increases in production are anticipated if the tract is leased and mined, haul distances will not increase, and overburden thickness on the tract is actually less than on the adjacent existing leases. Mining the tract could extend the life of the Belle Ayr Mine up to three years.

4.5.5 WATER RESOURCES

4.5.5.1 GROUNDWATER

As a result of statutory requirements and concerns, several studies and a number of modeling analyses have been conducted to help predict the impacts of surface coal mining on groundwater resources in the Wyoming portion of the Powder River Basin. Some of these studies and modeling analyses are discussed below.

In 1987, the USGS, in cooperation with the WDEQ and OSM, conducted a study of the hydrology of the eastern Powder River Basin. The resulting description of the cumulative hydrologic effects of all current and anticipated surface coal mining (as of 1987) was published in 1988 in the USGS Water-Resources Investigation Report entitled "Cumulative Potential Hydrologic Impacts of Surface Coal Mining in the Eastern Powder River Structural Basin, Northeastern Wyoming", also known as the "CHIA" (Martin, et al. 1988). This report evaluates the potential cumulative groundwater impacts of surface coal mining in the area. The CHIA analysis included the proposed mining of all the 1987 leases at all of the existing mines in the central mine group. It did not evaluate potential groundwater impacts related to additional coal leasing in this area and it did not consider the potential for overlapping groundwater impacts from coal mining and CBM development.

Each mine must assess the probable hydrologic consequences of mining as part of the mine permitting process. The WDEQ/LQD must evaluate the cumulative hydrologic impacts associated with each proposed mining operation before approving the mining and reclamation plan for each mine, and they must find that the cumulative hydrologic impacts of all anticipated mining would not cause material damage to the hydrologic balance outside of the permit area for each mine. As a result of these requirements, each existing approved mining permit includes an analysis of the hydrologic impacts of the surface coal mining proposed at that mine. If revisions to mining and reclamation permits are proposed, then the potential cumulative impacts of the revisions must also be evaluated. The existing permit for the Belle Ayr Mine addresses cumulative hydrologic impacts.

Additional groundwater impact analyses have also been conducted to evaluate the potential cumulative impacts of coal mining and CBM development. One example of these analyses is the report entitled A Study of Techniques to Assess Surface and Groundwater Impacts Associated with Coal Bed Methane and Surface Coal Mining, Little Thunder Creek Drainage, Wyoming (Wyoming Water Resources Center 1997). This study was prepared as part of a cooperative agreement involving WDEQ/LQD, the Wyoming State Engineer's Office, the WSGS, BLM, OSM and the University of Wyoming. The Wyodak CBM Project EIS (BLM 1999) presented the results of a modeling analysis of the potential cumulative impacts of coal mining and CBM development on groundwater in the coal and overlying aquifers as a result of coal mining and CBM development. The technical report for both this modeling analysis is available for public review at the BLM office in Buffalo, Wyoming (Applied Hydrology Associates, Inc. 1999).

Another source of data on the impacts of surface coal mining on groundwater is the monitoring that is required by WDEQ/LQD and administered by the mining operators. Each mine is required to monitor groundwater levels and quality in the coal and in the shallower aquifers in the area surrounding their operations. Monitoring wells are also required to record water levels and water quality in reclaimed areas.

The coal mine groundwater monitoring data is published each year by the Gillette Area Groundwater Monitoring Organization (GAGMO), a voluntary group formed in 1980. Members of GAGMO include most of the companies with operating or proposed mines in the Wyoming Powder River Basin, WDEQ, the Wyoming State Engineer's Office, BLM, USGS, and OSM. GAGMO contracts with an independent firm each year to publish the annual monitoring results. In 1991, GAGMO published a report summarizing the water monitoring data collected from 1980 to 1990 in the Wyoming Powder River Basin (Hydro-Engineering 1991b). In 1996, they published a report summarizing the data collected from 1980 to 1995 (Hydro-Engineering 1996a).

The major groundwater issues related to surface coal mining that have been identified by scoping are:

- the effect of the removal of the coal aquifer and any overburden aquifers within the mine area and replacement of these aquifers with spoil material;
- the extent of the temporary lowering of static water levels in the aquifers around the mine due to dewatering associated with removal of these aquifers within the mine boundaries;
- the effects of the use of water from the subcoal Fort Union Formation by the mines;

- changes in water quality as a result of mining; and
- potential overlapping drawdown in the coal due to proximity of coal mining and CBM development.

The impacts of large scale surface coal mining on a cumulative basis for each of these issues are discussed in the following paragraphs.

The effects of replacing the coal aquifer and overburden with a spoils aquifer is the first major groundwater concern. The following discussion of recharge, movement, and discharge of water in the spoil aquifer is excerpted from the CHIA (Martin et al. 1988:24):

> Postmining recharge, movement and discharge of groundwater in the Wasatch aquifer and Wyodak coal aquifer will probably not be substantially different from premining conditions. Recharge rates and mechanisms will not change substantially. Hydraulic conductivity of the spoil aquifer will be approximately the same as in the Wyodak coal aquifer allowing groundwater to move from recharge areas where clinker is present east of mine areas through the spoil aquifer to the undisturbed Wasatch aquifer and Wyodak coal aquifer to the west.

GAGMO data from 1990 to 1999 verify that recharge has occurred and is continuing in the backfill (Hydro-Engineering 1991a, 1992, 1993, 1994, 1995, 1996b, 1997, 1998, 1999). The water monitoring summary reports prepared each year by GAGMO list current water levels in the monitoring wells completed in the backfill and compare them with the 1980 water levels, as estimated from the 1980 coal water-level contour maps. In the 1991 GAGMO 10-year report, some recharge had occurred in 88 percent of the 51 backfill wells reported for that year. In the 1999 GAGMO report, 89 percent of the 64 backfill wells measured contained water.

Coal companies are required by state and federal law to mitigate any water rights that are interrupted, discontinued, or diminished by mining.

The cumulative size of the backfill area in the Powder River Basin and the duration of mining activity would be increased by mining of the recently issued leases and the currently proposed LBA tract. However, since reclamation is occurring in mined-out areas and the monitoring data demonstrate that recharge of the backfill is occurring, it is not anticipated that cumulative impacts would change as a result of the pending leasing actions.

Clinker, also called scoria, the baked and fused rock formed by prehistoric burning of the Wyodak-Anderson coal seam, occurs all along the coal outcrop area (Figure 4-1) and is believed to be the major recharge source for the spoil aquifer, just as it is for the coal. However, not all clinker is saturated. Some clinker is mined for road-surfacing material, but saturated clinker is not generally mined since abundant clinker exists above the water table and does not present the mining problems that result from mining saturated clinker. Therefore, the major recharge source for the spoil aquifer is not being disturbed by current mining. Clinker is not present on the Belle Ayr 2000 Tract.

The second major groundwater issue is the extent of water level drawdown in the coal and shallower aquifers in the area surrounding the mines. Most of the monitoring wells included in the GAGMO 15-year report (542 wells out of 600 total) are completed in the coal beds, in the overlying sediments, or in sand channels or interburden between the coal beds. The changes in water levels in the coal seams after 15 years of monitoring as indictated in the 1996 GAGMO 15-year report (Hydro Engineering 1996a) were well within the predicted worst-case 5-ft drawdown derived from groundwater modeling done by the mines. WDEQ/LQD policy is to have the mining companies determine the extent of the 5-ft drawdown contour as a method of determining off-site impacts from the various mining operations.

The additional groundwater impacts that would be expected as a result of extending mining into the LBA's issued or proposed to date would be to extend the drawdown into areas surrounding the proposed new leases. Cumulative drawdowns in the coal and overburden aquifers at the end of 1998 and at their maximum extent 2023 were evaluated during WDEQ/LQD permit renewal activities and are discussed at length in Appendix 3.5-7 of Permit #214. These drawdown predictions are due to mining only and do not account for drawdowns due to CBM production. In the coal aquifer, the maximum extent of cumulative drawdown is predicted to extend approximately 0.7 mile further west than is predicted for the Belle Ayr Mine alone simulation. There is little difference between the predictions of maximum extent of drawdown for the mine alone and for the cumulative simulations. Because of its relatively small size and location between existing leases, mining the Belle Ayr 2000 Tract is not expected to change the predicted cumulative drawdown of mining the existing leases at the Belle Ayr Mine and Caballo Mine.

The CHIA predicted the approximate area of 5 feet or more water level decline in the Wyodak coal aquifer which would result from "all anticipated coal mining". All of the currently producing mines, including the Belle Ayr Mine, were considered in the CHIA analysis (Martin et al. 1988). The study predicted that water supply wells completed in the coal may be affected as far away as eight miles from mine pits, although the effects at that distance were predicted to be minimal.

As drawdowns propagate to the west, available drawdown in the coal aquifer increases. Available drawdown is defined as the elevation difference between the potentiometric surface (elevation to which water will rise in a well bore) and the bottom of the aquifer. Proceeding west, the coal depth increases faster than the potentiometric surface declines, so available drawdown in the coal increases. Since the depth to coal increases, most stock and domestic wells are completed in units above the coal. Consequently, with the exception of CBM wells, few wells are completed in the coal in the areas west of the mines. Those wells that are completed in the coal have considerable available drawdown, so adverse impacts to wells outside the immediate mine area are unlikely.

Wells in the Wasatch Formation were predicted to be impacted by drawdown only if they were within 2,000 feet of a mine pit (Martin et al. 1988). Drawdowns occur farther from the mine pits in the coal than in the shallower aquifers because the coal is a confined aquifer that is areally extensive. The area in which the shallower aquifers (Wasatch Formation, alluvium, and clinker) experience a 5-ft drawdown would be much smaller than the area of drawdown in the coal because the shallower aquifers are generally discontinuous, of limited areal extent, and may be confined or unconfined.

Figure 4-1 shows the Belle Ayr Mine life of mine drawdown map with the maximum modeled drawdowns from the Wyodak CBM superimposed. These modeled drawdowns are for CBM only in the Wyodak Coal and are for the Proposed Action of 3,000 CBM wells (BLM 1999, 1999a). Figure 4-1 shows a projected extent of drawdown in the coal caused by mining at the Belle Ayr Mine alone of approximately 5 feet in areas where anticipated drawdown due to CBM production is some 500 feet. The 1999 GAGMO monitoring data support the models illustrated in Figure 4-1.

The proposed Two Elk project, if constructed, would add to cumulative impacts. Currently, water demands for the Two Elk project have not been finalized. The likely source of supply for the Two Elk project will be the Lance-Fox Hills Aquifer. Because of the distance between the Belle Ayr 2000 Tract and the proposed Two Elk Power Plant, the groundwater impacts of these two projects are not expected to overlap.

Potential water-level decline in the subcoal Fort Union Formation is the third major groundwater issue. According to the Wyoming State Engineer's records as of July 1999, 14 mines hold permits for 42 wells between 400 feet and 10,000 feet deep. The zone of completion of these wells was not specified, and not all of the wells were producing (for example, three of the permits were held by an inactive mine, and one of the wells permitted by the Black Thunder Mine has not been used since 1984).

The Tullock member is in the lower Fort Union Formation. Water level declines in the Tullock Aquifer have been documented in the Gillette area. According to Crist (1991), these declines are most likely attributable to pumpage for municipal use by Gillette and for use at subdivisions and trailer parks in and near the city of Gillette. Most of the water-level declines in the subcoal Fort Union wells occur within one mile of the pumped wells (Crist 1991; Martin et al. 1988). The mine facilities in the Powder River Basin are separated by a distance of one mile or more, so little interference between mine supply wells would be expected.

The Belle Ayr Mine holds a permit for the Plant #2 Well, a water supply well that is completed in the Fort Union Formation. Belle Ayr also obtains water from the Belle Ayr No. 4 well, which is completed in the Fox Hills Formation. Use of water from this well does not impact the Tullock Aquifer. Extending the life of the mine with the LBA would not necessarily result in additional water being withdrawn from the Tullock Aquifer because Belle Ayr also uses the Fox Hills well. If additional water is withdrawn, it would not be expected to extend the area of water level drawdown due to the discontinuous nature of the sands in the Tullock Aquifer and the fact that drawdown and yield reach equilibrium in a well due to recharge effects. Under the Proposed Action, an increase in annual water consumption from the deep wells is not expected because production, employment and equipment are not expected to increase.

Water requirements and sources for the proposed Two Elk project are not currently known. The State Engineer is discouraging further development of the lower Fort Union aquifers, so the most likely source for Two Elk is the Lance-Fox Hills. This would reduce the chances that Two Elk will add to cumulative hydrologic impacts of mining.

The fourth issue of concern with groundwater is the effect of mining on water quality; specifically, the effect mining may have on the water quality in the surrounding area, and the potential water quality problems in the spoil aquifer following mining.

In a regional study of the cumulative impacts of coal mining, the median concentrations of dissolved solids and sulfates were found to be larger in water from spoil aquifers than in water from either the Wasatch overburden or the coal aquifer (Martin et al. 1988). This is expected because blasting and movement of the overburden materials exposes more surface area to water, increasing dissolution of soluble materials, particularly when the overburden materials were situated above the saturated zone in the premining environment. On the basis of studies done in North Dakota, it was estimated that at least one pore volume of water must leach the spoil before the dissolved solids concentration in the water would be similar to the premining dissolved solids concentration (Houghton et al. 1987). One pore volume of water is the volume of water which would be required to saturate the spoils following reclamation. The time required for one pore volume of water to pass through the spoil aquifer is greater than the time required for the postmining groundwater system to re-establish equilibrium. According to the CHIA, estimates of the time required to re-establish equilibrium range from tens to hundreds of years (Martin et al. 1988).

Chemical analyses of 336 samples collected between 1981 and 1986 from 45 wells completed in spoil aquifers at ten mines indicated that the quality of water in the spoil will, in general, meet state standards for livestock use when recharge occurs (Martin et al. 1988). The major current use of water from the aquifers being replaced by the spoils (the Wasatch and Wyodak Coal aquifers) is for livestock because these aquifers are typically high in dissolved solids in their premining state (Martin et al. 1988).According to monitoring data published by GAGMO (Hydro-Engineering 1991a, 1991b, 1992, 1993, 1994, 1995, 1996b, 1997, 1998 and 1999), TDS values in backfill wells have ranged from 400 to 25,000 mg/l. Of the 43 backfill wells measured in 1998 and reported in the 1999 annual GAGMO report (Hydro Engineering 1999), TDS in 70 percent were less than 5,000 mg/l, TDS in 28 percent were between 5,000 and 10,000 mg/l, and TDS in one well was above 10,000 mg/l. These data support the conclusion that water from the spoils will generally be acceptable for its current use, which is livestock watering, before and after equilibrium is established. Leasing and mining of the LBA tract would increase the total volume of spoil and, thus, the time for equilibrium to re-establish.

The fifth area of concern is the potential for cumulative impacts to groundwater resources in the coal due to the proximity of coal mining and CBM development. The Wyodak coal is being developed for both coal and CBM in the same general area. Dewatering activities associated with existing and reasonably foreseeable CBM development have been and would be expected to continue to overlap with and expand the area of groundwater drawdown in the coal aquifer in the Powder River Basin over what would occur due to coal mining alone.

Numerical groundwater flow modeling was used to predict the drawdown impacts of the Wyodak CBM Project EIS (BLM 1999). The modeling considered coal mining and CBM development in order to assess cumulative impacts. Modeling was done to simulate mining with and without CBM development in order to differentiate the impacts of the two types of activities.

As expected, modeling showed that the additional groundwater impacts that would result from CBM development would be additive in nature and would extend the area experiencing a loss in hydraulic head to the west of the mining area. The area between the CBM fields and the mines would be subjected to cumulative impacts of the two activities. The 15-year GAGMO report points out that there are already areas of overlapping impacts between the Marquiss and Lighthouse CBM projects and the Caballo, Belle Ayr and Cordero-Rojo mines (Hydro-Engineering 1996a).

Figure 4-1 shows the Belle Ayr Mine life of mine drawdown map with the maximum modeled drawdowns from the Wyodak CBM Project EIS superimposed. These modeled drawdowns are for CBM only in the upper Wyodak Coal and are for the Proposed Action of 3,000 CBM wells (BLM 1999, 1999b). The groundwater modeling study done for the Wyodak CBM EIS considered the impacts of coal mining and CBM development on groundwater in the coal and overlying aquifers in the area shown in Figure 1-2 using the existing coal mines and predicted CBM well locations based on discussions with CBM operators.

Drawdowns in the coal caused by CBM development would be expected to reduce the need for dewatering in advance of mining, which would be beneficial for mining. Wells completed in the coal may also experience increased methane emissions in areas of aquifer depressurization. There would be a potential for conflicts to occur over whether the coal mining operations or CBM operations are responsible for replacing or repairing private water well users who are adversely impacted by the drawdowns.

As discussed previously, coal companies are required by state and federal law to mitigate any water rights that are interrupted, discontinued, or diminished by coal mining. In response to concerns about the potential impacts of CBM development on water rights, a group of CBM operators and local landowners developed a standard water well monitoring and mitigation agreement that can be used on a case-by-case basis as development proceeds. The BLM decision record for the Gillette South CBM Project EIS (BLM 1997) requires that CBM operators offer landowners this agreement as part of the federal well approval process.

BLM and industry have cooperated to develop a system of monitoring wells designed to monitor groundwater levels in the coal and in shallower aquifers in areas of CBM production. In the future, the CBM operators will be responsible for drilling and maintaining additional monitoring wells as the area of CBM development expands.

The increased dewatering or depressuring of the coal seam caused by CBM development and mining together will also increase the time required for water-level recovery to occur after the CBM and mining projects are completed.

4.5.5.2 SURFACE WATER

Surface coal mining reduces streamflows because of the regulations that require all runoff from disturbed areas to be captured and treated in sedimentation ponds. Also, the surface coal mine pits in the Powder River Basin are large, and these pits, together with ponds and diversions built to keep water out of the pits, can intercept the runoff from large drainage areas.

Changes in drainage patterns and surface disturbance are decreasing and will continue to decrease flows in most of the ephemeral and intermittent drainages exiting the mine sites. Development of CBM resources in the area west of the mines could potentially increase surface flow in some drainages. The amount of CBM produced water that ultimately reaches the major channels is reduced by evaporation, infiltration into the ground, and surface landowners, who sometimes divert the produced water into reservoirs for livestock use because it is of relatively good quality. The Wyodak CBM Project EIS (BLM 1999, 1999b) evaluates impacts of CBM production over a large project area, extending from over 30 miles north of Gillette to over 60 miles south of Gillette. The project area would extend westward from the Powder River Basin coal mine areas for a distance of 18 to 36 miles. The Wyodak CBM project considers 3,000 to 5,000 CBM wells that would each generate 12 gpm of water. This water would be discharged at an estimated 500 to 1,000 different locations over a period of 10 to 20 years. These CBM water discharges would be constant, as opposed to naturally occurring flows which fluctuate widely on a seasonal and annual basis. Most streams in the area are naturally dry throughout most of each year.

The USGS has predicted that, after reclamation, major streams in the Powder River Basin will exhibit increased runoff ranging from 0.4 percent in the Cheyenne River to 4.3 percent in Coal Creek due to cumulative disturbance as a result of existing surface coal mining (Martin et al. 1988). This is based on the assumption that unit runoff rates will be increased after reclamation due to soil compaction, and the percentage changes in runoff are based on permitted mine acreages in 1981. The new leases issued since that time have increased the permitted acreage by about 40 percent and would, under the same assumptions, increase the USGS's estimates of runoff increase by the same incremental amount. This minor increase in runoff is small compared to seasonal and annual variability of runoff in the Powder River Basin.

Sediment concentrations should not increase in area streams even with the addition of mining the pending and recently issued LBA tracts because, as discussed in Section 4.1.5, state and federal regulations require that all surface runoff from mined lands pass through sedimentation ponds. The potential for cumulative adverse impacts to the Belle Fourche River drainage is also minimal because it is typically dry for a substantial portion of the year.

The surface drainage from the Belle Ayr 2000 Tract flows toward Caballo Creek, which flows into the Belle Fourche River. The 118 acres of new surface disturbance added by mining the Belle Ayr 2000 Tract would not change the cumulative impacts to surface water quality and quantity in the area.

The CBM discharges could result in erosion and degradation of small drainages, which could affect water quality and channel hydraulic characteristics. From a surface water standpoint, the increased flows due to CBM discharges and the reduced flows due to surface coal mining will tend to offset each other. However, conflicts could also result. The CBM development takes place upstream from the mines. Provisions the mines have taken to prevent water from entering the pits (e.g., storage ponds or diversions) could be adversely affected by having to deal with flows that were not included in designs or that change conditions for future designs

4.5.6 ALLUVIAL VALLEY FLOORS

There are no AVFs on the Belle Ayr 2000 Tract, and therefore no changes in cumulative impacts to alluvial valley floors are expected to occur as a result of leasing and subsequent mining of the Belle Ayr 2000 Tract. Impacts to designated 's are generally not permitted if the AVF is determined to be significant to agriculture. AVF's that are not significant to agriculture can be disturbed during mining but they must be restored as part of the reclamation process. Impacts during mining, before the AVF is restored, would be expected to be incremental, not additive.

4.5.7 WETLANDS

No wetlands will be impacted under the Proposed Action for the Belle Ayr 2000 Tract. Wetlands are discrete features that are delineated on the basis of specific soil, vegetation, and hydrologic characteristics. Wetlands within areas of coal mining disturbance are impacted; wetlands outside the area of disturbance are generally not affected unless their drainage areas (hence, water supplies) are changed by mining. Therefore, the impacts to wetlands as a result of surface coal mining are mostly incremental, not additive as are impacts to groundwater and air quality. Increasing the area to be mined would increase the number of wetlands that would be impacted.

COE requires replacement of all impacted jurisdictional wetlands in accordance with Section 404 of the Clean Water Act. As part of the mining and reclamation plans for each mine, COE approves the plan to restore the wetlands and the number of acres of wetlands to be restored. Replacement of functional wetlands may occur in accordance with agreements with the private landowners; no federal surface lands are included in the Belle Ayr 2000 Tract. During mining and before replacement of wetlands, all wetland functions would be lost. The replaced wetlands may not function in the same way as the premine wetlands did.

4.5.8 VEGETATION

Most of the land that is being or would be disturbed by mining in the Wyoming Powder River Basin is grassland, sagebrush shrubland or breaks grassland and is used for grazing and wildlife habitat. Rangeland is, by far, the predominant land use in the

Powder River Basin, comprising 92 percent of the land use in Converse and Campbell Counties. Previously cultivated lands would be disrupted by mining the Belle Ayr 2000 Tract. At the completion of mining, it is anticipated that all disturbed land would be reclaimed for grazing and wildlife habitat, mostly in the form of mixed native grass prairie, sagebrush shrubland and, where appropriate, bottomland grassland. Some of the minor community types, such as those occurring on breaks, would not be restored to premining conditions but may be replaced to a higher level due to use of better quality soils. Following reclamation and release of the reclamation bond, privately owned surface lands would be returned to agricultural management by the private land owner.

Community and species diversities would initially be lower on reclaimed lands than on unmined grasslands and shrublands. The shrub components would take the longest to be restored to premining conditions. Shrub cover and forage values would gradually increase in the years following reclamation. Over longer periods of time, species re-invasion and shrub establishment on reclaimed lands should largely restore the species and community diversity on these lands to premining levels.

Over the long term, the net effect of the cumulative mine reclamation plans may be the restoration, at least in part, of all vegetation types originally found in the area. However, the shrub component may be substantially reduced in areal extent. Shrubs are relatively unproductive for livestock but very important for wildlife.

4.5.9 WILDLIFE

The direct impacts of surface coal mining on wildlife occur during mining and are therefore short-term. They include road kills by mine-related traffic, restrictions on wildlife movement created by fences, spoil piles and pits, and displacement of wildlife from active mining areas. The indirect impacts are longer term and include loss of carrying capacity and microhabitats on reclaimed land due to flatter topography, less diverse vegetative cover, and reduction in sagebrush density.

Cumulative impacts to most wildlife would increase as additional habitat is disturbed but would moderate as more land is reclaimed. Raptor and grouse breeding areas have been diminishing statewide for at least the last 30 years due, in part, to surface-disturbing activities. Coal mining and gas exploration and development have been identified as potential contributors to the decline in their breeding habitat. Therefore, surface occupancy and disturbance restrictions, as well as seasonal restriction stipulations, have been applied to operations occurring on or near these crucial areas on public lands. Because of the split mineral estate that exists in the Powder River Basin, yearlong prohibitions on surface occupancy and restrictions on activities near areas critical to grouse have not proven successful. These restrictions and stipulations have helped to protect important raptor and grouse habitat on public lands. Erection of nesting structures and planting of trees on reclaimed land will gradually replace raptor nesting and perching sites. There is little crucial habitat for waterfowl or fish on the mine sites. Small- and medium-sized animals will rapidly move back into the areas once reclamation is completed.

Numerous grazing management projects (fencing, reservoir development, spring development, well construction, vegetative treatments) have also impacted wildlife habitat in the area. The consequences of these developments have proven beneficial to some species and detrimental to others. Fencing has aided in segregation and distribution of livestock grazing, but sheep-tight woven wire fence has restricted pronghorn movement. Water developments are used by wildlife; however, without proper livestock management, many of these areas can become overgrazed. The developed reservoirs provide waterfowl, fish, and amphibian habitat. Vegetation manipulations have included the removal or reduction of native grass-shrublands and replacement with cultivated crops (mainly alfalfa/grass hay), as well as a general reduction of shrubs (mainly sagebrush) in favor of grass. These changes have increased spring and summer habitat for grazing animals, but have also reduced the important shrub component that is critical for winter range, thus reducing overwinter survival for big game and sage grouse. The reduction in sagebrush has been directly blamed for the downward trend in the sage grouse populations.

The regional EIS's (BLM 1974, 1979, 1981, and 1984b) predicted significant cumulative impacts to pronghorn from existing concentrated mining and related disturbance as a result of habitat disturbance and creation of barriers to seasonal and daily movements. Significant cumulative indirect impacts were also predicted because of increased human population and access resulting in more poaching, increased vehicle/pronghorn collisions, and increased disturbance in general.

The Belle Ayr 2000 Tract is located within the Mule Deer Herd Unit 21 and the Pronghorn Herd Unit 24. Each of these units are approximately 940 square miles, or 60,160 acres (Olin Oedekoven, WY Game and Fish 2000). The additional cumulative disturbance of 118 acres anticipated as a result of mining the Belle Ayr 2000 Tract represents less than two-tenths of one percent of the herd unit areas.

The area of active mining in the Wyoming Powder River Basin contains many raptor nests. The largest concentration of nesting activity in the area is associated with the rough breaks country and areas where trees have become established. Raptor mitigation plans are included in the approved mining and reclamation plans of each mine. The raptor mitigation plan for each mine is subject to USFWS review and approval before the mining and reclamation plan is approved. Any nests that are impacted by mining operations must be relocated in accordance with these plans, after

113

special use permits are secured from USFWS and WGFD. The creation of artificial raptor nest sites and raptor perches may ultimately enhance raptor populations in the mined area. On the other hand, where power poles border roads, perched raptors may continue to be illegally shot and continued road kills of scavenging eagles may occur. Any influx of people into previously undisturbed land may also result in increased disturbance of nesting and fledgling raptors.

Cumulative impacts to waterfowl from already-approved mining, would be minor because most of these birds are transient and most of the ponds are ephemeral. In addition, the more permanent impoundments and reservoirs that are impacted by mining would be restored. Sedimentation ponds and wetland mitigation sites would provide areas for waterfowl during mining.

Few vital sage grouse wintering areas or leks have been, or are planned to be, directly impacted by already-approved mining. However, noise related to the mining activity could indirectly impact sage grouse reproductive success. Sage grouse leks close to active mining could be abandoned if mining-related noise elevates the existing ambient noise levels. Surface coal mining activity is known to contribute to a drop in male sage grouse attendance at leks close to active mining, and over time this can alter the distribution of breeding grouse (Remington and Braun 1991). No sage grouse have been observed on or near the Belle Ayr 2000 Tract during annual monitoring surveys for the adjacent Belle Ayr Mine, and there is no sage grouse habitat on the existing crested wheatgrass pastureland.

The existing and proposed mines in the Powder River Basin would cumulatively cause a reduction in habitat for other mammal and bird species. Many of these species are highly mobile, have access to adjacent habitats, and possess a high reproductive potential. As a result, these species should respond quickly and invade suitable reclaimed lands as reclamation proceeds.

Cumulative impacts on fish habitat and populations would be minimal because local drainages generally have limited value due to intermittent or ephemeral flows. Some of the permanent pools along drainages support minnows and other nongame fish, and the larger impoundments and streams in the area which have fish populations would be restored following mining.

Additional discussions of cumulative impacts to wildlife from coal development and industrialization of the eastern Powder River Basin are discussed in BLM regional EIS's for the area (BLM 1974, 1979, 1981, 1984b), and these documents are incorporated by reference into this EIS. The impacts predicted in these documents have generally not been exceeded.

Potential cumulative impacts to T&E species are discussed in Appendix C.

4.5.10 LAND USE

In addition to reducing livestock grazing and wildlife habitat, surface coal mining also disrupts conventional oil and gas development, releases CBM resources that are not produced prior to mining and limits access to public lands.

Cumulative impacts resulting from energy extraction in the Powder River Basin include a reduction of livestock grazing and subsequent revenues, a reduction in habitat for some species of wildlife (particularly pronghorn and mule deer), and loss of recreational access to public lands (particularly for hunters).

The Belle Ayre 2000 Tract is located within the Belle Ayr Mine Permit Area and no public lands are included on the tract. There are no recreation facilities, wilderness areas, etc., in the immediate vicinity of the existing central group of mines, and the majority of the land is seldom used by the public except for dispersed recreation (e.g., hunting), off-road vehicles, and sightseeing. Hunting and other public access is generally limited inside of the mine permit areas for safety reasons. Approximately 80 percent of the land surface in this area is private and access is controlled by the landowner.

Energy development has been the primary cause of human influx into the eastern Powder River Basin. The increased human presence associated with the cumulative energy development in the Powder River Basin has likely increased levels of legal and illegal hunting. Conversely, the mines in the area have become refuges for big game animals during hunting seasons since they are often closed to hunting. Reclaimed areas are attractive forage areas for big game. As an example, reclaimed lands at the Jacobs Ranch Mine have been declared crucial elk winter habitat by WGFD (Oedekoven 1994).

The demand for outdoor recreational activities, including hunting and fishing, has increased proportionately to the population increase. However, at the same time these demands are increasing, wildlife habitat and populations are being reduced. This conflict between decreased habitat availability and increased recreational demand has had (and may continue to have) several impacts: demand for hunting licenses may increase to the point that a lower success in drawing particular licenses will occur; hunting and fishing, in general, may become less enjoyable due to more limited success and overcrowding; poaching may increase; the increase in people and traffic has and may continue to result in shooting of nongame species and road kills; and increased off-road activities have and will continue to result in disturbance of wildlife during sensitive wintering or reproductive periods.

Campbell County's public recreation facilities are some of the most extensively developed in the Rocky Mountain Region, and use by young, recreation-oriented residents is high. The relatively strong financial position of the county recreation program appears to assure future recreation opportunities for residents regardless of the development of the LBA tract or any other specific mine.

4.5.11 CULTURAL RESOURCES

In most cases, treatment of eligible sites is confined to those that would be directly impacted, while those that may be indirectly impacted receive little or no consideration unless a direct mine-associated effect can be established. The higher population levels associated with coal development coupled with increased access to remote areas can result in increased vandalism both on and off mine property. Development of lands in which coal is strip-mineable (shallow overburden) may contribute to the permanent unintentional destruction of segments of the archeological record.

A majority of the known cultural resource sites in the Powder River Basin are known because of studies at existing and proposed coal mines. An average density estimate of 8.5 sites per mi^2 (640 acres) can be made based on inventories at existing mines in the area, and approximately 25 percent of these sites are typically eligible for the NRHP. Approximately 550 cultural resource sites will be impacted by already-approved mines, with an estimated 140 of these sites being eligible for nomination to the NRHP. Clearly, a number of significant sites, or sites eligible for nomination to the NRHP, have been or will be impacted by coal mining operations within the Powder River Basin.

Ground disturbance, the major impact, can affect the integrity of or destroy a site. In the case of the Belle Ayr 2000 Tract, the land surface has already been cultivated. Changes in setting or context greatly impact historical properties. Mitigation measures such as stabilization, restoration, or moving of buildings may cause adverse impacts to context, in-place values, and overall integrity. Additionally, loss of sites through mitigation can constitute an adverse impact by eliminating the site from the regional database and/or affecting its future research potential.

Beneficial results or impacts can also occur from coal development. Valuable data are collected during cultural resource surveys. Data that would otherwise not be collected until some time in the future, or lost in the interim, are made available for study. Mitigation also results in the collection and preservation of data that would otherwise be lost. The data that has been and will be collected provided opportunities for regional and local archeological research projects.

4.5.12 NATIVE AMERICAN CONSULTATION

No cumulative impacts to Native American traditional values or religious sites have been identified as a result of leasing and subsequent mining of the Belle Ayr 2000 Tract.

4.5.13 PALEONTOLOGICAL RESOURCES

Impacts to paleontological resources as a result of the already-approved cumulative energy development occurring in the Powder River Basin consist of losses of plant, invertebrate, and vertebrate fossil material for scientific research, public education (interpretive programs), and other values. Losses have and will result from the destruction, disturbance, or removal of fossil materials as a result of surface-disturbing activities, as well as unauthorized collection and vandalism. A beneficial impact of surface mining can be the exposure of fossil materials for scientific examination and collection, which might never occur except as a result of overburden removal, exposure of rock strata, and mineral excavation.

4.5.14 VISUAL RESOURCES

A principal visual impact in this area is the visibility of mine pits and facility areas. People most likely to see these facilities would either be passing through the area or visiting it on mine-related business. Except for the loading facilities and the draglines, the pits and facilities are not visible from more than a few miles away. No new facilities would be required to mine the Belle Ayr Mine 2000 Tract as an extension of the existing Belle Ayr Mine. Issuance of a lease for the Belle Ayr 2000 Tract would not change this impact.

After mining, the reclaimed slopes generally appear somewhat smoother than premining slopes, however, the landscape of the reclaimed mine areas look very much like undisturbed landscape in the area.

4.5.15 NOISE

Existing land uses within the Powder River Basin (e.g., mining, livestock grazing, oil and gas production, transportation, and recreation) contribute to noise levels, but wind is generally the primary noise source. Mining on the LBA tract would not increase the number of noise-producing facilities within the Powder River Basin, but it would lengthen the time this particular noise source would exist and may augment the level of impacts to other resources (e.g., increased exposure of wildlife to noise impact, increased noise impacts to recreational users). Mining-related noise is generally masked by the wind at short distances, so cumulative overlap of noise impacts between mines is not likely.

Recreational users and grazing lessees utilizing lands surrounding active mining areas do hear mining-related noise; but this has not been reported to cause an impact. As stated above, wildlife in the immediate vicinity of mining may be adversely affected by noise; however, observations at other surface coal mines in the area indicate that wildlife generally adapt to noise conditions associated with active coal mining.

Cumulative increases in noise from trains serving the Powder River Basin mines have caused substantial increases (more than five dBA) in noise levels along segments of the rail lines over which the coal is transported to markets.

4.5.16 TRANSPORTATION FACILITIES

New or enhanced transportation facilities (road, railroads, and pipelines) are expected to occur as a result of continuing energy development in the Powder River Basin. However, no new cumulative impacts to transportation facilities are expected to occur as a direct result of leasing and subsequent mining of the Belle Ayr 2000 Tract. The transportation facilities for the Belle Ayr Mine are already in place. Bishop Road would have to be relocated, and traffic levels from the mine will be maintained for a longer period under the Proposed Action.

4.5.17 SOCIOECONOMICS

Because of all the energy-related development that has been occurring in and around Converse and Campbell Counties during the past 30 years, socioeconomic impacts have been a major concern. Wyoming's economy has been structured around the basic industries of extractive minerals, agriculture, tourism, timber, and manufacturing. Each of these basic industries is important, and the extractive mineral industry has long been a vital part of Wyoming's economy. Many Wyoming communities depend on the mineral industry for much of their economic well being. The minerals industry is by far the largest single contributor to the economy of Wyoming. In 1998, valuation on minerals produced in 1997 was $4,017,611,483. This was 54 percent of the State's total valuation and placed Wyoming among the top ten mineral producing states in the nation (Wyoming Department of Revenue, 2000). Properties and most minerals are taxed as a percentage of their assessed valuation.

Since 1989, coal production in the Powder River Basin has increased by an average of 6.8 percent per year. WSGS has projected a 1 percent per year increase in coal production in Wyoming from 2000 through 2005. In 1998, Wyoming coal supplied approximately 29 percent of the United States' steam coal needs when Powder River Basin coal was used to generate electricity for public consumption in 25 states as well as Canada and Spain (Lyman and Hallberg 1999). Electricity consumers in those states benefit from low prices for Powder River Basin coal, from cleaner air due to the low sulfur content of the coal, and from the royalties and bonus payments that the federal government receives from the sale of the coal.

Locally, continued sale of Powder River Basin coal helps stabilize municipal, county, and state economies. BLM's 1996 projection predicted that annual coal production would generate about $2.6 billion of total economic activity, including $351 million of personal income, and support the equivalent of nearly 15,885 full-time positions in 2005 (BLM 1996a).

Three tracts, the Powder River, Thundercloud and Horse Creek tracts, were recently leased in southern Campbell County and the surrounding area. Projected employment increases of up to 335 persons were predicted as a result of mining these tracts. No increase in employment is expected with the leasing and mining of the Belle Ayr 2000

Tract.

A number of mineral and related developments have occurred, are in progress, or are anticipated in Campbell County and the surrounding area. The North Rochelle Mine located southeast of Wright, WY has completed an $83.6 million mine construction phase. Construction of the mine facilities began in June 1997 and was completed in 1999.

Construction of the $744 million ENCOAL facility was planned to coincide with the North Rochelle Mine expansion with construction starting in late 1997 and lasting approximately two years. This project has been indefinitely delayed.

The Two Elk power plant is currently in the developmental stage, and North American Power Group is working on permitting and marketing. According to a recent article in the *Gillette News-Record*, the cost of constructing the proposed plant is estimated at $300 million; construction could last three years; and the construction-phase work force could peak at more than 600 persons. (*Gillette News Record* 2000a).

According to information provided by the Dakota, Minnesota & Eastern Railroad Corporation, construction of the DM&E railroad line was expected to start in 1999, take two years and cost $1.5 billion. For Wyoming, the estimated direct construction-phase work force is 700 persons. In December 1998, DM&E got preliminary approval from the Surface Transportation Board, but must complete an environmental analysis as the next step of the approval process. The draft EIS has been completed and is available for public review.

Currently, Gillette is experiencing a population increase as a result of CBM development in this area. According to a March 26, 2000 article in the *Gillette News-Record*, in the past year Gillette's population has increased, unemployment has decreased, housing has becoming increasingly tight, and traffic and criminal activity have increased (*Gillette News-Record* 2000b). School enrollment has not seen an increase over last year, however.

If all of the new projects are undertaken, it is likely that the population in northeastern Wyoming would continue to grow, and there would be increasing demands on housing, schools, roads, law enforcement, etc. in the communities in this area. The population increase would be expected to be somewhat dispersed among all of the communities in the area, which would include Douglas, Wright, and Newcastle as well as Gillette. The extent of the impacts to the local communities would depend on the amount of overlap between the construction periods on the proposed projects. It was previously estimated that construction of the North Rochelle, ENCOAL and Two Elk projects could have added up to 2,900 people in northeastern Wyoming if they had been undertaken at the same time. As it has actually happened, development of these projects has not occurred concurrently. The North Rochelle construction project has been completed, CBM development is currently contributing to population in the Gillette area, construction at the Two Elk and Wygen power plants could begin in the near future, construction of the proposed DM&E railroad is waiting on completion of the environmental analyses, and the ENCOAL project has been postponed indefinitely.

During the construction phase of the developmental projects, assistance money could total $7.5 million for Gillette, $4.43 million for Campbell County and $527,000 for Wright (Planning Information Corp. 1997). Assuming local sales and use tax permits are required, the developmental projects if approved would generate about $12.5 million for Gillette, Wright and Campbell County. The State of Wyoming would receive approximately $16.99 million from the developmental projects. Ad valorem tax is paid on production and property (Wyoming; Department of Commerce, Energy Section 1997). If all three developmental projects had proceeded as planned, ad valorem tax paid in 2001 was estimated to approach $10 million (*Gillette News-Record* 1996b).

4.6 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

From 1999 on, the Belle Ayr Mine would be able to produce coal at the projected production level for another 25 years under the Proposed Action. As the coal is mined, almost all components of the present ecological system, which have developed over a long period of time, would be modified. In partial consequence, the reclaimed land would be topographically lower, and although it would resemble original contours, it would lack some of the original diversity of geometric form.

The forage and associated grazing and wildlife habitat that the LBA tract provides would be temporarily lost during mining and reclamation. During mining of the LBA tract, there would be a combined loss of cultivated vegetation on 118 acres (Proposed Action) with an accompanying disturbance of wildlife habitat and grazing land. This disturbance would occur incrementally over a period of years. The mine site would be returned to equivalent or better forage production capacity for domestic livestock before the performance bond is released. Long-term productivity would depend largely on postmining range-management practices, which to a large extent would be controlled by private landowners.

There would be a deterioration of the groundwater quality in the lease area because of mining; however, the water quality would still be adequate for livestock and wildlife. This deterioration would probably occur over a long period of time. In the coal aquifer depth to groundwater would increase as much as five miles away from the pits during mining. The water levels in the coal aquifer should return to premining levels at some time (possibly more than 100 years) after mining has ceased.

Mining operations and associated activities would degrade the air quality and visual resources of the area on a short-term basis. Following coal removal, removal of surface facilities, and completion of reclamation, there would be no long-term impact on air quality. The long-term impact on visual resources would be negligible.

The Proposed Action would extend the life of Belle Ayr Mine by two to three years, thereby enhancing the long-term economy of the region.

4.7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The major commitment of resources would be the mining and consumption of 29 million tons (Proposed Action) of coal to be used for electrical power generation. CBM that is not recovered from this coal before it is mined would also be irreversibly and irretrievably lost. It is estimated that 1-2 percent of the energy produced would be required to mine the coal, and this energy would also be irretrievably lost.

The quality of topsoil on approximately 118 acres (Proposed Action) would be irreversibly changed. Soil formation processes, although continuing, would be irreversibly altered during mining-related activities. Newly formed soil material would be unlike that in the natural landscape.

Loss of life may conceivably occur due to the mining operation and vehicular and train traffic. On the basis of surface coal mine accident rates in Wyoming as determined by the Mine Safety and Health Administration (1997) for the 10-year period 1987-1996, fatal accidents (excluding contractors) occur at the rate of 0.003 per 200,000 man-hours worked. Disabling (lost-time) injuries occur at the rate of 1.46 per 200,000 man-hours worked. Any injury or loss of life would be an irretrievable commitment of human resources.

Disturbance of all known historic and prehistoric sites on the mine area would be mitigated to the maximum extent possible. However, accidental destruction of presently unknown archeological or paleontological values would be irreversible and irretrievable.

5 CONSULTATION AND COORDINATION

In addition to this EA, other factors and consultations are considered and play a major role in determining the decision on this proposed lease application. These include the following.

Regional Coal Team Consultation. The Belle Ayr 2000 lease application was reviewed and discussed at the October 25, 2000 RCT public meeting in Cheyenne, Wyoming. The RCT determined that the land in the application met the qualifications for processing as a production maintenance tract and recommended that the application be processed as a maintenance lease by application.

Governor's Consultation. The BLM Wyoming State Director notified the Governor of Wyoming on August 24, 2000 that RAG had filed a lease application with BLM for the Belle Ayr 2000 Tract.

Public Notice. The BLM published a Notice of Scoping for the Belle Ayr LBA and Jacobs Ranch Coal Company's North Jacobs Ranch LBA in the *Federal Register* on October 7, 1999. A public scoping meeting was held for both applications on October 19, 1999 in Gillette, Wyoming.

On July 28, 2000, RAG Wyoming Land Company, Inc. filed: 1) a request to remove the Belle Ayr 2000 Tract from the LBA tract they applied for in 1997 and 2) a separate lease application for the Belle Ayr 2000 Tract. Public scoping for the Belle Ayr 2000 application took place during September, 2000.

The BLM will publish a Notice of Availability/Notice of Public Hearing in the Federal Register for this draft EA. The public comment period on this draft EA will last 30 days. Following the comment period on the draft EA, a final EA will be prepared. Comments from the public, state and federal review agencies will be considered in preparing the final EA, and BLM will respond to these comments in the final EA

Attorney General Consultation. After a coal lease sale, but prior to issuance of a lease, the BLM will solicit the opinion of the U.S. Attorney General on whether the planned lease issuance creates a situation inconsistent with federal anti-trust laws.

Other Consultations. Olin Oedekoven, biologist with the Wyoming Game and Fish Department in Gillette Wyoming was consulted in preparation of this EA. Gwen McKee of Powder River Eagle Studies was consulted in preparation of Appendix C.

List of Preparers and Reviewers. Table 5-1 provides a listing of the BLM interdisciplinary team and the third-party consultant personnel who prepared and or reviewed this EA.

Distribution List. This EIS was distributed to numerous congressional offices, federal agencies, state governments, local governments, industry representatives, interest groups, and individuals for their review and comment (Table 5-2).

Table 5-1. List of Preparers and Reviewers

Name	Education/Experience	Responsibility
BLM/USFS/OSM INTERDISCIPLINARY TEAM		
Core Team		
Nancy Doelger, BLM	M.S., B.S. Geology, 24 years professional experience (Licensed Wyoming Geologist)	Project Coordinator
Mike Karbs, BLM	M.S., Regional Planning and Public Policy, B.S., Mineral Engineering, 26 years professional experience	Document Reviewer
Mel Schlagel, BLM	M.S., Agricultural Economics, 33 years professional experience	Document Reviewer
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Support Team		
Charlie Gaskill, BLM	M.S., B.S. Geology, years professional experience (Licensed Wyoming Geologist)	Geologist
Bruce Lessig, BLM	B.S., Geology, 21 years professional experience	Mining Engineering
Julie Weaver, BLM	B.A.., Communications, 19 years professional experience	Adjudicator
B.J. Earle, BLM	B.A., Archaeology, 23 years professional experience	Cultural Resources
Laurie Bryant, BLM	Ph.D., Paleontology, 37 years professional experience	Paleontological Resources
Larry Gerard, BLM	B.S., Wildlife Management, 23 years professional experience	Wildlife Resources
Mike Brogan, BLM	B.S. Watershed Management/Hydrology /Forestry, 21 years professional experience	Hydrology
Joe Meyer, BLM	B.S. Watershed Management/Soils Minor, 17 years professional experience	Soils
Tim Nowak, BLM	M.A., Anthropology/Archaeology, 32 years professional experience	Native American Consultation
Darla Pindell	CPA, M.B.A., BA., Financial Administration, 20 years experience	Socioeconomics

Steve Hageman	B.S., Chemistry, 23 years experience	Appraiser
Susan Caplan, BLM	M.S., Air Resource Management, B.S., Meterology & Mathematics, 15 years professional experience.	Air Quality

ENVIRONMENTAL SOLUTIONS, INC.

Ann Dickey	B.S. Civil Engineering, 11 years professional experience (Licensed Professional Engineer)	Project Management Report Preparation
Tom Peterson	B.S., Environmental Engineering, 23 years professional experience	Report Preparation Document Review
Dennis McGirr	B.S., Biology, 24 years professional experience	Report Preparation, Document Review

CADTECH SERVICES

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WESTERN WATER CONSULTANTS, INC.

Mike Evers	M.S., B.S. Geology, 15 years professional experience	Report Preparation Groundwater Sections

Table 5-2. Distribution List - Draft EA

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U.S. Senator Craig Thomas
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U.S. Senate Committee on Environment & Public Works
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Federal Agencies

Bureau of Land Management
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Buffalo, WY
Miles City, MT

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Minerals Management Serv.
Denver, CO

National Park Service
Lakewood, CO

Office of Surface Mining
Reclamation & Enforcement
Casper, WY
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U.S. Fish & Wildlife Service
Helena, MT

U.S. Army Corps of Engineers
Cheyenne, WY
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U.S. Dept. of the Interior
Natural Resources Library,
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Gillette, WY

Senator Bill Hawks
Casper, WY

Senator Tom Kinnison
Sheridan, WY

Senator John Schiffer
Kaycee, WY

Senator Steven Youngbauer
Gillette, WY

State Agencies

Wyoming Business Council
Cheyenne, WY

Wyoming Dept. of Agriculture
Cheyenne, WY

Wyoming Dept. of
Employment
Research and Planning
Casper, WY

Wyoming Department of
Environmental Quality
Cheyenne, WY
Sheridan, WY

Wyoming Department of
Transportation
Cheyenne, WY
Gillette, Wyoming
Sheridan, Wyoming

Wyoming Director of Federal
Land Policy
Cheyenne, WY

Wyoming Div. of Economic
Analysis
Cheyenne, WY

Wyoming Game & Fish Dept.
Cheyenne, WY
Gillette, WY
Lander, WY
Sheridan, WY

Wyoming Industrial Siting Division
Cheyenne, WY

Wyoming Oil and Gas Conservation Commission
Casper, WY

Wyoming Parks & Cultural Resources Department
Cheyenne, WY

Wyoming Public Service Commission
Cheyenne, WY

Wyoming State Clearinghouse
Cheyenne, WY

Wyoming State Engineer's Office
Cheyenne, WY

Wyoming State Geological Survey
Laramie, WY

Wyoming State Inspector of Mines
Rock Springs, WY

Wyoming Water Development Commission
Cheyenne, WY

Local Government

Campbell County Economic Development Committee
Gillette, WY

Campbell Co. Commissioners
Gillette, WY

Campbell County School Superintendent
Gillette, WY

Campbell County Road & Bridge Dept.
Gillette, WY

City of Douglas
Douglas, WY

City of Gillette
Gillette, WY

Converse Co. Commissioner
Mr. Leon Chamberlain
Douglas, WY

Converse Co. Commissioners
Douglas, WY

Converse Co. Joint Powers Board
Douglas, WY

Converse Co. Planning Office
Douglas, WY

Converse Co. School District
Douglas, WY

Indian Tribes & Tribal Governments

William C'Hair
Arapahoe, WY

Haman Wise
Fort Washakie, WY

Francis Brown
Riverton, WY

Delphine Clair
Fort Washakie, WY

Arapahoe Business Council
Fort Washakie, WY

Shoshone Business Council
Fort Washakie, WY

Shoshone Tribal Attorney
Ft. Washakie, WY

Clifford Long Sioux
Busby, MT

Crow Tribal Council
Crow Agency, MT

Crow Tribal Administration
Crow Agency, MT

Northern Cheyenne Cultural Committee
Lame Deer, MT

Northern Cheyenne Tribal Council
Lame Deer, MT

Steven Brady
Lame Deer, MT

Santee Sioux Tribal Council
Niobrara, NE

Cheyenne River Sioux Tribal Administration
Eagle Butte, SD

Flandreau Santee Sioux Executive Committee
Flandreau, SD

Crow Creek Sioux Tribal Council
Fort Thompson, SD

Oglala Sioux Tribal Council
Pine Ridge, SD

Lower Brule Sioux Tribe
Lower Brule, SD

Rosebud Sioux Tribe
Rosebud, SD

Industry and Business

RAG Coal West
Gillette, WY

American Colloid Co.
Belle Fourche, SD

Antelope Coal Company
Gillette, WY

Ark Land Company
Fairview, IL

Amjac
Laramie, WY

Baccari & Associates
Sheridan, WY

Barrett Resources Corp.
Denver, CO

Belle Ayr Mine
Gillette, WY

Bjork, Lindley, Danielson &
Baker, P.C.
Denver, CO

Bridgeview Coal Company
Farmington, PA

Bucksin Mine
Gillette, WY

Burlington Northern Railroad
Fort Worth, TX

Burns & McDonnell
Kansas City, MO

BXG, Inc.
Boulder, CO

Cavalier Petroleum
Corporation/ Newport
Exploration
Englewood CO

C.H. Snyder Company
Kittanning, PA

CE&MT, Inc.
Gillette, WY

CH2M Hill
Englewood, CO

Consol, Inc.
Pinckneyville, IL

Cordero-Rojo Mine Complex
Gillette, WY

Decker Coal Company
Omaha, NE

Duke Energy
Denver, CO

Douglas Chamber of Commerce
Douglas, WY

Dry Fork Coal Company
Gillette, WY

Eagle Butte Mine
Gillette, WY

ECC
Casper, WY

ENCOAL
Gillette, WY

Evergreen Enterprises
Casper, WY

Foster-Wheeler
Environmental
Lakewood, CO

Exxon Corporation
Houston, TX

Gerald Jacob
Environmental Const.
Boulder, CO

Gillette Chamber of Commerce
Gillette, WY

Glenrock Coal Co.
Glenrock, WY

Greystone
Greenwood, CO

Hardin & Associates
Castle Rock, CO

Ind. Consultant Network
Brian Kennedy
Boulder, CO

Intermountain Resources
Laramie, WY

Jacobs Ranch Coal Corp.
Gillette, WY

KN Energy
Lakewood, CO

Kennecott Energy Company
Gillette, WY

Kenneth R. Paulsen
Consulting
Arvada, CO

Kfx Wyoming
Gillette, WY

Kiewit Mining Co.
Sheridan, WY

L.E. Peabody & Associates
Alexandria, VA

M&K Oil Company
Gillette, WY

Marston & Marston
St. Louis, MO

McGraw-Hill
Washington D.C.

Meineadair Consultants
Arvada, CO

Mine Engineers, Inc.
Cheyenne, WY

Mining Associates of Wyoming
Casper, WY

Nerco Coal Co.
Ione, CA

North Rochelle Mine
Gillette, WY

P&M Coal Company
Englewood, CO

PacifiCorp/Interwest Mining
Company
Salt Lake City, UT

Pendragon Resources
Denver, CO

PIC Technologies
Denver, CO

Poudre Environmental
Consultants
Ft. Collins, CO

Powder River Eagle Studies
Inc.
Gillette, WY

Powder River Coal Company
Gillette, WY

Powder River Energy Corp.
Sundance, WY

Redstone Resources
Newcastle, WY

Riverside Technology, Inc.
Fort Collins, CO

Royal Gold, Inc.
Denver, CO

San Juan Coal Co.
Waterflow, NM

Shea & Gardner
Washington, D.C.

The Rim Companies
Englewood, CO

Thunder Basin Coal Company
Wright, WY

Torch Energy
Houston, TX

TRC Mariah Associates Inc.
Laramie, WY

TRC Environmental
Englewood, CO

Triton Coal Company
Gillette, WY

URS Greiner Woodward Clyde
Denver, CO

US West Communications
Casper, WY
Denver, CO

Western Water Consultants, Inc.
Sheridan, WY

Western Gas Resources
Denver, CO

Western Fuels Association
Lakewood, CO

Western Energy Co.
Colstrip, MT

Wright Chamber of Commerce
Wright, WY

Wyodak Resources Dev.
Corporation
Gillette, WY

Yates Drilling Company
Artesia, NM

Interest Groups & Professional Societies

Advisory Council on Historic
Preservation
Golden, CO

Audubon Society
Casper, WY
Cheyenne, WY
Sheridan, WY

Foundation for North American
Wild Sheep
Cody, WY

Friends of the Bow/
Biodiversity Associates
Laramie, WY

Institute for Policy Research
Northwestern University
Evanston, IL

Izaak Walton League of
America
Casper, WY

Inyan Kara Grazing Assoc.
Newcastle, WY

Law Fund
Boulder, CO

Medicine Wheel Alliance
Huntley, MT

National Mining Association
Washington, D.C.

National Wildlife Federation
Washinton, D.C.

Natural Resources Defense
Council
San Francisco, CA

Petroleum Assoc. of Wyoming
Casper, WY

Powder River Basin Resource
Council
Sheridan, WY

Sierra Club
Sheridan, WY

The Fund for Animals
Jackson, WY

The Nature Conservancy
Laramie, WY

Thunder Basin Grazing Assoc
Douglas, WY

Wildlife Management Institute
Fort Collins, CO

Wind River Multiple
Use Advocates
Riverton, WY

Wyoming Stock Growers
Assoc.
Cheyenne, WY

Wyoming Wildlife Federation
Cheyenne, WY

Wyoming Geological Assoc.
Casper, WY

Wyoming Outdoor Council
Lander, WY

Wyoming Association of
Professional Archaeologists
Casper, WY
Laramie, WY

Wyoming Bankers Association
Cheyenne, WY

Wyoming Wool Growers
Association
Casper, WY

Wyoming Mining Association
Cheyenne, WY

Wyoming Heritage Society
Casper, WY

Wyoming Public Lands Council
Casper, WY

Individuals

Ralph Barbero

Scott Benson

Ken & Angie Bertalot

Sheldon Bierman

Bonnie Condley

Cecil Cundy

Alice Davis

Richard & Helen Dunlap

Ladd Frary

Mildred & Ralph Galyen

Elizabeth Goodnough

Kenneth & Vicki Hall

Nancy Higgins

Lori Hjorth

Steven & Deborah Johnson

Robert & Beverly Lawson

Louis S. Madrid

F. L. Natta

Ted Olson

Helen Oliver

John Pexton

Asa Reed

Howard Robb

William & Kathryn Robb

C.J. Robertson

Ann & James Rourke

Bernard Rourke Trust

Paul Rourke

Bill Saulcy

Dorothy & Wesley Severson

Dave Shippy

Edna Siren

David & Jesse Thompson

Dave & Jean Wagner

John Williams

Mark Winland

Libraries

The Libraries
Colorado State University
Fort Collins, CO

Univ. of Wyoming Libraries
Laramie, WY

Media

Coal Daily
Washington, D.C.

Gillette News-Record
Gillette, WY

Rocky Mountain Oil Journal
Denver, CO

Western Coal Newsletter
Knoxville, TN

Cheyenne-Wyoming Eagle
Cheyenne, WY

Associated Press
Cheyenne, WY

Casper Journal
Casper, WY

Casper Star-Tribune
Casper, WY

The Douglas Budget
Douglas, WY

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7.0 Glossary

aboriginal - Related to early or primitive cultures in a region.

ad valorem tax - A tax paid as a percentage of the assessed value of property.

adverse impact -An apparent direct or indirect detrimental effect.

aliquot - An exact portion.

alkalinity - The degree to which the pH of a substance is greater than 7.

alluvial deposit - Deposits of clay, silt, sand, gravel, and/or other materials carried by moving surface water, such as streams, and deposited at points of weak water flow; alluvium.

alluvial valley floors (AVFs) - An area of unconsolidated stream-laid deposits holding streams with water availability sufficient for subirrigation or flood irrigation agricultural activities (see 30 CFR 701.5).

alluvium - Sorted or semi-sorted sediment consisting of clay, silt, sand, gravel, or other unconsolidated rock material deposited in comparatively recent geologic time by a stream or other body of running water in the bed of that stream or on its flood plain or delta.

alternative - In terms of the National Environmental Policy Act, one of several substitute or alternate proposals that a federal agency is considering in an environmental analysis.

ambient -Surrounding conditions (or environment) in a given place and time.

anastomosing - the channel pattern of a braided stream

annual precipitation - The quantity of water that falls yearly in the form of rain, hail, sleet, and snow.

approximate original contour - Post-mining surface configuration achieved by backfilling and grading of mined-out areas so that the reclaimed land surface resembles the general surface configuration of the land prior to mining (see 30 CFR 701.5).

aquatic - Living or growing in or on the water.

aquiclude - a body of relatively unpermeable rock that is capable of absorbing water slowly but does not transmit it rapidly enough to supply a well or spring.

aquifer - A layer of permeable rock, sand, or gravel that stores and transmits water in sufficient quantities for a specific use.

aquitard - a confining bed that retards but does not totally prevent the flow of water to or from an adjacent aquifer, a leaky confining bed.

arithmetic mean - The sum of values of n numbers divided by n. It is usually referred to as simply the "mean" or "average".

ash - The residual non-combustible matter in coal that comes from included silt, clay, silica, or other substances. The lower the ash content, the better the quality of the coal.

avian - Of, relating to, or derived from birds.

backfill - The operation of refilling an excavation. Also, the material placed in an excavation when it is refilled.

baseline - Conditions, including trends, existing in the human environment before a proposed action is begun; a benchmark state from which the environmental consequences of an action are forecast; the no-action alternative.

beneficial impact - An apparent direct or indirect advantageous effect.

bentonite - A clay formed by the decomposition of volcanic ash which has the ability to absorb large amounts of water and to expand to several times its normal volume; used in adhesives, cements and ceramic fillers.

bonus - That value in excess of the rentals and royalties that is paid to the United States as part of the consideration for receiving a lease for publicly owned minerals [see 43 CFR 3400.0-5(c)].

braided stream - A stream flowing in several dividing and reuniting channels resembling the strands of a braid.

buffer zone - An area between two different land uses that is intended to resist, absorb, or otherwise preclude development or intrusion between the two use areas.

bypass coal - An isolated part of a coal deposit that is not leased and that can only be economically mined in an environmentally sound manner as a part of continued mining by an existing adjacent operation [see 43 CFR 3400.0.5(d)].

clinker (scoria) - Baked and fused rock resulting from in-place burning of coal deposits.

coal bed methane - Methane gas that is generated during the coal-forming process.

colluvium - Rock fragments, sand, or soil material that accumulates at the base of slopes; slope wash.

confined (groundwater) - groundwater under pressure significantly greater than that of the atmosphere. Its upper surface is the bottom of an impermeable bed or a bed of distinctly lower permeability than the material the water occupies.

confluence - The point at which two or more streams meet.

conglomerate - A rock that contains rounded rock fragments or pebbles cemented together by another mineral substance.

contiguous - Lands or legal subdivisions having a common boundary, lands having only a common corner are not contiguous.

cooperating agency - An agency which has jurisdiction by law in an action being analyzed in an environmental document and who is requested to participate in the NEPA process by the agency that is responsible for preparing the environmental document [see 40 CFR 1501.6 and 1508.5].

crucial wildlife habitat - Parts of the habitat necessary to sustain a wildlife population during periods of their life cycle. It may be a limiting factor on the population, such as nesting habitat or winter habitat.

cultural resources - The remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that reveal the nature of historic and prehistoric human events. These resources consist of (1) physical remains, (2) areas where significant human events occurred, and (3) the environment immediately surrounding the resource.

cumulative impact - The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

decibel - A unit of sound measurement. In general, a sound doubles in loudness for every increase of 10 decibels.

depredate - prey upon.

dip - The angle at which a rock layer is inclined from the horizontal.

direct (or primary) impact - An impact caused by an action that occurs at the same time and place as the action (see 40 CFR 1508.8).

discharge - Any of the ways that ground water comes out of the surface, including through springs, creeks, or being pumped from a well.

dissected upland - An upland or high area in which a large part of the original surface has been deeply cut into by streams.

dragline - A type of excavating crane that casts a rope- or cable-hung bucket a considerable distance, collects the dug material by pulling the bucket toward itself on the ground with a second rope or cable, elevates the bucket, and dumps the material on a backfill bank or pile.

eolian deposit - Sediment carried, formed, or deposited by the wind, as sand dunes.

ephemeral stream - A stream that flows occasionally because of surface runoff, and is not influenced by permanent ground water.

erosion - The wearing away of the land surface by running water, wind, ice or other geologic agents.

evapotranspiration - The sum total of water lost from the land by evaporation and plant transpiration.

excavation (archeological) - The scientifically controlled recovery of subsurface materials and information from a cultural site. Recovery techniques are relevant to research problems and are designed to produce maximum knowledge about the site's use, its relation to other sites and the natural environment, and its significance in the maintenance of the cultural system.

fair market value - The amount in cash, or in terms reasonably equivalent to cash, for which in all probability a coal deposit would be sold or leased by a knowledgeable owner willing but not obligated to sell or lease to a knowledgeable purchaser who desires but is not obligated to buy or lease.

fixed carbon - In coal, the solid combustible material remaining after removal of moisture, ash, and volatile matter. It is expressed as a percentage.

floodplain -The relatively flat area or lowland adjoining a body of flowing water, such as a river or stream, that is covered with water when the river or stream overflows its banks.

fluvial - Of or pertaining to a river or rivers.

forage - Vegetation used for food by wildlife, particularly big game wildlife, and domestic livestock.

forb - Any herbaceous plant other than a grass, especially one growing in a field or meadow

formation (geologic) - A rock body distinguishable from other rock bodies and useful for mapping or description. Formations may be combined into groups or subdivided into members.

fossil - The remains or traces of an organism or assemblage of organisms that have been preserved by natural processes in the earth's crust. Many minerals that may be of biologic origin are not considered to be fossils (e.g. oil, gas, asphalt, limestone).

geometric mean - The nth root of the product of the values of n positive numbers.

ground water - Subsurface water that fills available openings in rock or soil materials to the extent that they are considered water saturated.

habitat - A place where a plant or animal naturally or normally lives and grows.

habituation - The process of becoming accustomed to, or used to, something; acclimation.

hazardous materials - Substance which, because of its potential for corrosivity, toxicity, ignitability, chemical reactivity, or explosiveness, may cause injury to persons or damage to property.

hazardous waste - Those materials defined in Section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and listed in 40 CFR § 261.

heterogenous - Made up of dissimilar constituents.

homoclinal - a series of rock strata having the same dip.

human environment - The natural and physical environment and the relationship of people with that environment (see 30 CFR 1508.14).

hydraulic conductivity - The capacity of a medium to transmit water; permeability coefficient. Expressed as the volume of water at the prevailing temperature that will move in unit time under a unit hydraulic gradient through a unit area. Units include gallons per day per square foot, centimeters per second.

hydraulic - Pertaining to fluid in motion, or to movement or action caused by water.

hydric soil - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic (water-loving) vegetation. Hydric soils that occur in areas having positive indicators of hydrophytic vegetation and wetland hydrology are wetland soils.

hydrocarbon - Any organic compound, gaseous, liquid, or solid, consisting solely of carbon and hydrogen.

hydrogeology - The science that deals with subsurface waters and with related geologic aspects of surface waters.

hydrology - The science dealing with the behavior of water as it occurs in the atmosphere, on the surface of the ground, and underground.

hydrophytic vegetation - The plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. When hydrophytic vegetation comprises a community where indicators of hydric soils and wetland hydrology also occur, the area has wetland vegetation.

impermeable - Not capable of transmitting fluids or gasses in appreciable quantities.

incised - Having a margin that is deeply and sharply notched.

indirect (or secondary) impact - A reasonably foreseeable impact resulting from an action but occurring later in time than or removed in distance from that action (see 40 CFR 1508.8).

in-place coal reserves - The estimated volume of all of the coal reserves in a lease without considering economic or technological factors which might restrict mining.

in-situ leach mining - Removal of the valuable components of a mineral deposit through chemical leaching without physical extraction of the rock.

interbedded - Layers of one type of rock, typically thin, that are laid between or that alternate with layers of another type of rock.

interburden -A layer of sedimentary rock that separates two mineable coal beds.
interdisciplinary - Characterized by participation or cooperation among two or more disciplines or fields of study.

intermittent stream - A stream that does not flow year-round but has some association with ground water for surface or subsurface flow.

irruptive - a natural population that undergoes a sudden upsurge in numbers especially when natural checks and balances are disturbed.

lagomorph - gnawing mammals, including rabbits, hares, and pikas.

laminated - Consolidated or unconsolidated sediment that is characterized by thin (less than 1 cm thick) layers.

land and resource management plan (LRMP) - A land use plan that directs the use and allocation of U.S. Forest Service lands and resources.

lead agency - The agency or agencies preparing or having taken primary responsibility for preparing an environmental document (see 40 CFR 1508.16).

lease (mineral) - A legal document executed between a mineral owner or lessor and another party or lessee which grants the lessee the right to extract minerals from the tract of land for which the lease has been obtained [see 43 CFR 3400.0-5(r)].

lek - A traditional breeding area for grouse species where territorial males display and establish dominance.

lenticular - Term describing a body of rock or earth that thins out in all directions from the center like a double convex optical lens.

limb (geologic) - One side of a fold (syncline or anticline).

limestone - A sedimentary rock consisting chiefly of calcium carbonate.

lineament - A linear topographic feature of regional extent that is believed to reflect crustal structure.

lithification - the conversion of a newly deposited, unconsolidated sediment into a coherent, solid rock, involving processes such as compaction, cementation, desiccation, or crystallization.

loadout facilities - The mine facilities used to load the mined coal for transport out of the mine.

loam - A rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter.

maintenance tract - A federal coal tract that would continue or extend the life of an existing coal mine.

major federal action - An action with effects that may be major and which is potentially subject to federal control and responsibility (see 40 CFR 1508.18).

maximum economic recovery (MER) - The requirement that, based on standard industry operating practices, all profitable portions of a leased federal coal deposit must be mined. MER determinations will consider existing proven technology; commercially available and economically feasible equipment; coal quality, quantity, and marketability; safety, exploration, operating, processing, and transportation costs; and compliance with applicable laws and regulations [see 43 CFR 3480.0-5(a)(24)].

meteorological -Related to the science dealing with the atmosphere and its phenomena, especially as relating to weather.

methane - A colorless, odorless, and inflammable gas; the simplest hydrocarbon; chemical formula = CH_4. It is the principal constituent of natural gas and is also found associated with crude oil and coal.

mineable coal - Coal that can be economically mined using present day mining technology.

mineral rights - The rights of one who owns the mineral estate (subsurface).

mining permit - A permit to conduct surface coal mining and reclamation operations issued by the state regulatory authority pursuant to a state program or by the Secretary pursuant to a federal program (see 30 CFR 701.5).

mitigation - An action to avoid, minimize, reduce, eliminate, replace, or rectify the impact of a management practice.

monoculture - One crop or product on the land.

mudstone - A hardened sedimentary rock consisting of clay. It is similar to shale but lacks distinct layers.

National Register of Historic Places (NRHP) - A list of districts, sites, buildings, structures and objects significant in American history, architecture, archeology and culture maintained by the Secretary of the Interior. Expanded as authorized by Section 2(b) of the Historic Sites Act of 1935 (16 U.S.C. 462) and Section 101(a)(1) (A) of the National Historic Preservation Act.

natural gas - Combustible gases (such as hydrocarbons) or mixtures of combustible gases and non-combustible gases (such as helium) which are in a gaseous phase at atmospheric conditions of temperature and pressure.

NEPA process - All measures necessary for compliance with the National Environmental Policy Act of 1969 (see 40 CFR 1508.21).

no action alternative - An alternative where no activity would occur. The development of a no action alternative is required by regulations implementing the National Environmental Policy Act (40 CFR 1502.14). The no action alternative provides a baseline for estimating the effects of other alternatives.

outcrop -A rock formation that appears at or near the surface; the intersection of a rock formation with the surface.

overburden - Material of any nature, consolidated or unconsolidated, that overlies a coal or other useful mineral deposit, excluding topsoil.

paleontological resource - A site containing evidence of plant or non-human animal life of past geological periods, usually in the form of fossil remains.

paludal - pertaining to a marsh.

peak discharge or flow - The highest discharge of water recorded over a specified period of time at a given stream location; also called maximum flow. Often thought of in terms of spring snowmelt, summer, fall or winter rainy season flows.

perched (groundwater) - unconfined ground water separated from an underlying main body of groundwater by an unsaturated zone.

perennial species (vegetation) - Vegetation that lives over from season to season.

perennial stream - A stream or part of a stream that flows continuously during the calendar year as a result of groundwater discharge or surface runoff.

permeability - The ability of rock or soil to transmit a fluid.

permit application package - A proposal to conduct surface coal mining and reclamation operations on federal lands, including an application for a permit, permit revision, or permit renewal and all the information required by SMCRA, the applicable state program, any applicable cooperative agreement, and all other applicable laws and regulations including, with respect to federal leased coal, the Mineral Leasing Act and its implementing regulations.

permit area - The area of land, indicated on the approved map submitted by the operator with his or her application, required to be covered by the operator's performance bond under the regulations at 30 CFR Part 800 and which shall include the area of land upon which the operator proposes to conduct surface coal mining and reclamation operations under the permit, including all disturbed areas (see 30 CFR 701.5).

physiography - Physical geography.

piezometer - A well, generally of small diameter, that is used to measure the elevation of the water table.

playa - The sandy, salty, or mud-caked flat floor of a basin with interior drainage, usually occupied by a shallow ephemeral lake during or after rain or snow storms.
point source (pollution) - A point at which pollution is added to a system, either instantaneously or continuously. An example is a smokestack.

porosity - The percentage of the bulk volume of rock, sediment or soil that is not occupied by sediment or soil particles; the void space in rock or sediment. It may be isolated or connected.

postmining topography - The relief and contour of the land that remains after mining has been completed.

potentiometric surface - The surface that coincides with the static level of water in an aquifer. The surface is represented by the levels to which water from a given aquifer will rise under its full hydrologic head.

predator - An animal that obtains food by killing and consuming other animals.

prime or unique farmland - Those lands which are defined by the Secretary of

Agriculture in 7 CFR part 657 (*Federal Register* Vol. 4 No. 21) and which have historically been used for cropland (see 30 CFR 701.5).

proposed action - In terms of National Environmental Policy Act, the project, activity, or action that a federal agency proposes to implement or undertake and which is the subject of an environmental analysis.

qualified surface owner - the natural person or persons (or corporation, the majority stock of which is held by a person or persons otherwise meeting the requirements of this section) who:

(1) Hold legal or equitable title to the surface of split estate lands;

(2) Have their principal place of residence on the land, or personally conduct farming or ranching operations upon a farm or ranch unit to be affected by surface mining operations; or received directly a significant portion of their income, if any, from such farming and ranching operations; and

(3) have met the conditions of (1) and (2) above for a period of at least three years, except for persons who gave written consent less than three years after they met the requirements of both (1) and (2) above [see 43 CFR 3400.0-5(gg)].

raptor - Bird of prey, such as an eagle, falcon, hawk, owl, or vulture.

recharge - The processes by which groundwater is absorbed into a zone of saturation.

reclamation - Rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves regrading, replacement of topsoil, revegetation and other work necessary to restore the disturbed area for post-mining use.

record of decision (ROD) - A document separate from, but associated with, an environmental impact statement that publicly and officially discloses the responsible official's decision on the proposed action (see 40 CFR 1505.2).

recoverable coal- The amount of coal that can actually be recovered for sale from the demonstrated coal reserve base.

rental payment - Annual payment from a lessee to a lessor to maintain the lessee's mineral lease rights.

resource management plan (RMP) - A land use plan, as prescribed by FLPMA, that directs the use and allocation of public lands and resources managed by BLM. Prior to selection of the RMP, different alternative management plans are compared and evaluated in an environmental impact statement (EIS) to determine which plan will best direct the management of the public lands and resources.

revegetation - The reestablishment and development of self-sustaining plant cover following land disturbance. This may occur through natural processes, or the natural processes may be enhanced by human assistance through seedbed preparation, reseeding, and mulching.

right of way (ROW) - The right to pass over property owned by another. The strip of land over which facilities such as roadways, railroads, or power lines are built.

riparian - The area adjacent to rivers and streams that lies between the stream channel and upland terrain and that supports specific vegetation influenced by perennial and/or intermittent water.

royalty (mineral) - A share of production that is free of the expense of production. It is generally paid by a lessee to a lessor of a mineral lease as part of the terms of the lease.

runoff - That portion of rainfall that is not absorbed; it may be used by vegetation, lost by evaporation, or it may find its way into streams as surface flow.

salinity - Refers to the solids, such as sodium chloride (table salt) and alkali metals, that are dissolved in water. Often in non saltwater areas, total dissolved solids is used as an equivalent term.

sandstone - A common sedimentary rock primarily composed of sand grains, mainly quartz, that are cemented together by other mineral material.

scoping - A public informational process required by the National Environmental Policy Act to determine private and public concerns, scope of issues, and/or questions regarding a proposed action to be evaluated in an environmental impact analysis.

scoria (clinker) - Baked and fused rock resulting from in-place burning of coal deposits.

sedimentation pond - An impoundment used to remove solids from water in order to meet water quality standards or effluent limitations before the water leaves the permit area (see 30 CFR 701.5).

semi-arid - A climate or region characterized by little yearly rainfall and by the growth of a number of short grasses and shrubs.

severance tax - A tax on the removal of minerals from the ground.

shale - A very fine-grained clastic rock or sediment consisting predominately of clay-sized particles that is laminated; lithified, layered mud.

significant impact - A qualitative term used to describe the anticipated importance of impacts to the human environment as a result of an action.

siltstone - A fine-grained clastic rock consisting predominately of silt-sized particles.

socioeconomics - The social and economic situation that might be affected by a proposed action.

soil survey - The systematic examination, description, classification, and mapping of soils in an area, usually a county. Soil surveys are classified according to the level of detail of field examination. Order I is the most detailed and Order V is the least detailed.

spontaneous combustion - The heating and slow combustion of coal and coaly material initiated by the absorption of oxygen.

stipulations - Requirements that are part of the terms of a mineral lease. Some stipulations are standard on all Federal leases. Other stipulations may be applied to specific leases at the discretion of the surface management agency to protect valuable surface resources or uses existing on those leases.

storage coefficient - The volume of water that can be released from storage per unit surface area of a saturated confined aquifer, per unit decline in the component of hydraulic head normal to the surface. It is calculated by taking the product of the specific storage and the aquifer thickness.

stratigraphic - Of, relating to, or determined by stratigraphy, which is the branch of geology dealing with the study of the nature, distribution, and relations of layered rocks in the earth's crust.

stripping ratio - The unit amount of overburden that must be removed to gain access to a similar unit amount of coal.

subirrigation - In alluvial valley floors, the supplying of water to plants from underneath, or from a semi-saturated or saturated subsurface zone where water is available for use by vegetation (see 30 CFR 701.5).

subbituminous -A lower rank of coal (35-45% carbon) with a heating value between that of bituminous and lignite, usually 8,300-11,500 Btu per pound. Subbituminous coal contains a high percentage of volatile matter and moisture.

surface disturbance - Any disturbance by mechanical actions which alters the soil surface.

surface rights - Rights to the surface of the land, does not include rights to oil, gas, or other subsurface minerals or subsurface rights.

suspended solids - The very fine soil particles which remain in suspension in water for a considerable period of time without contact with the stream or river channel bottom.

tectonic fracture - Fractures caused by deformation of the earth's crust.

threatened and endangered (T&E) species - These species of plants or animals classified as threatened or endangered pursuant to section 4 of the Endangered Species Act. Any species which is in danger of extinction, or is likely to become so within the foreseeable future.

> ***Category 1*** - Substantial biological information on file to support the appropriateness of proposing to list as endangered or threatened.
>
> ***Category 2*** - Current information indicates that proposing to list as endangered or threatened is possibly appropriate, but substantial biological information is not on file to support an immediate ruling (U.S. Fish and Wildlife Service).

topography - Physical shape of the ground surface; the configuration of land surface including its relief, elevation, and the position of its natural and manmade features.

topsoil - The surface layer of a soil.

total dissolved solids (TDS) - The total quantity in milligrams per liter of dissolved materials in water.

transmissivity - The rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient. Equals the hydraulic conductivity multiplied by the aquifer thickness. Values are given in units of gallons per day per foot.

transpiration - The discharge of water vapor by plants.

truck & shovel - A mining method used to remove overburden and coal in a strip mining operation. Truck and shovel operations use large bucket-equipped digging and loading machines (shovels) and large dump trucks to remove overburden instead of using a dragline for overburden removal.

typic - Typical.

unsuitability criteria - The 20 criteria described in 43 CFR 3461, the application of which results in an assessment of federal coal lands as suitable or unsuitable for surface coal mining.

uranium - A very hard, heavy, metallic element that is crucial to development of atomic energy.

vegetation type - A kind of existing plant community with distinguishable characteristics described in terms of the present vegetation that dominates an area.

vertebrate fossils - The remains of animals that possessed a backbone; examples are fish, amphibians, reptiles, dinosaurs, birds, and mammals.

vesicular - Rock containing many small cavities which were formed by the expansion of a bubble of gas or steam during the solidification of the rock.

visual resources - The physical features of a landscape which can be seen (e.g., land, water, vegetation, structures, and other features).

Visual Resource Management (VRM) - The systematic means to identify visual values, establish objectives which provide the standards for managing those values, and evaluate the visual impacts of proposed projects to ensure that objectives are met.

volatile matter - In coal, those substances, other than moisture, that are given off as gas or vapor during combustion.

waterfowl - A bird that frequents water, especially a swimming bird.

wetlands - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient, under normal circumstances, to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands include marshes, bogs, sloughs, potholes, river overflows, mud flats, wet meadows, seeps, and springs [see 33 CFR 328.3(a)(7)(b)].

wild and scenic river - Rivers or sections of rivers designated by Congressional actions under the 1968 Wild and Scenic Rivers Act as wild, scenic, or recreational by an act of the Legislature of the state or states through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

wild river areas - Rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

scenic river areas - Rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

recreational river areas - Rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

wilderness - An area of undeveloped Federal land designated wilderness by Congress, retaining its primeval character and influence, without permanent improvements or human habitation, protected and managed to preserve its natural conditions and that (1) generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable, (2) has outstanding opportunities for solitude or primitive and unconfined recreation, (3) has at least 5,000 acres or is of sufficient size to make practical its preservation and use in an unimpaired condition, and (4) also may contain features that are of ecological, geological, scientific, educational, scenic, or historical value. These characteristics were identified by Congress in the Wilderness Act of 1964.

APPENDIX A

FEDERAL AND STATE PERMITTING REQUIREMENTS AND AGENCIES

Federal And State Agencies and Permitting Requirements	
Agency	**Lease/Permit/Action**
FEDERAL	
Bureau of Land Management	Coal lease Resource recovery and protection plan Scoria sales contract Exploration drilling permit
Office of Surface Mining Reclamation and Enforcement	Mining plan approval document preparation SMCRA oversight
Office of the Secretary of the Interior	Mining plan approval
Mine Safety and Health Administration	Safety Permit and Legal ID Ground Control Plan Major Impoundments Explosive use and storaga permit
Bureau of Alcohol, Tobacco, and Firearms	Explosive's manufacturer's license Explosive use and storage permit
Federal Communication Commission	Radio permit: ambulance Mobile relay system radio license
Nuclear Regulatory Commission	Radioactive byproducts material license
Army Corps of Engineers	Authorization of impacts to wetlands and other waters in the US
Federal Aviation Administration	Radio tower permits
Department of Transportation	Hazardous waste shipment notification
STATE	
State Land Commission	Coal lease Scoria lease
Department of Environmental Quality, Land Quality Division	Permit and license to mine
Department of Environmental Quality, Air Quality Division	Air quality permit to operate Air quality permit to construct
Department of Environmental Quality, Water Quality Division	National pollutant discharge elimination system water discharge permit Permit to construct sedimentation pond Authorization to construct septic tank and leach field Authorization to construct and install a public water supply and sewage treatment system
Department of Environmental Quality, Solid Waste Management Program	Solid waste disposal permit--permanent and construction
State Engineer's Office	Appropriation of surface water permits Appropriation of groundwater permits
Industrial Siting Council	Industrial siting certificate of nonjurisdiction
Department of Health	Radioactive material certificate of registration

APPENDIX B

BLM SPECIAL COAL LEASE STIPULATIONS

159

SPECIAL STIPULATIONS

In addition to observing the general obligations and standards of performance set out in the current regulations, the lessee shall comply with and be bound by the following stipulations.

These stipulations are also imposed upon the lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the lessee to comply with the terms of the lease. The lessee shall require his agents, contractors and subcontractors involved in activities concerning this lease to include these stipulations in the contracts between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the lessor and the lessee at any time to adjust to changed conditions or to correct an oversight.

(a) Cultural Resources

(1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the authorized office of the BLM or of the surface managing agency, if different, on portions of the mine plan area and adjacent areas, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. The inventory shall be conducted by a qualified professional cultural resource specialist (i.e., archeologist, historian, historical architect, as appropriate), approved by the Authorized Officer of the surface managing agency (BLM, if the surface is privately owned), and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Assistant Director of the Western Support Center of the Office of Surface Mining, the Authorized Officer of the BLM, if activities are associated with the coal exploration outside an approved mining permit area (hereinafter called Authorized Officer), and the Authorized Officer of the surface managing agency, if different. The lessee shall undertake measures, in accordance with instructions from the Assistant Director or Authorized Officer to protect cultural resources on the lease lands. The lessee shall not commence the surface disturbing activities until permission to proceed is given by the Assistant Director or Authorized Officer.

(2) The lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

(3) The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Assistant Director or Authorized Officer, or the Authorized Officer of the surface managing agency. The lessee shall not disturb such resources except as may be subsequently authorized by the Assistant Director or Authorized Officer. Within two (2) working days of notification, the Assistant Director or Authorized Officer will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the Authorized Officer of the BLM or of the surface managing agency, if different.

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

(b) **Paleontological Resources**

If a paleontological resource, either large and conspicuous, and/or of significant scientific value is discovered during any surface disturbing activities, the find will be reported to the Authorized Officer immediately. Surface disturbing activities will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological value. Operations within 250 feet of such a discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The lessee will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant interest discovered during the operation.

(c) **Threatened, Endangered, Candidate, or Other Special Plant and Animal Species**

The lease area may contain habitat for the following threatened, endangered, candidate, or other special status plant and animal species: black-footed ferret, bald eagle, mountain plover, Ute Ladies'-tresses, swift fox, sturgeon chub, and black-tailed prairie dog. If surveys performed during the permit application process or future permit revisions indicate that any threatened, endangered, candidate, or other special status plant/animal species could be impacted by proposed coal mining and reclamation operations located on this lease and the potential impacts to that species cannot be satisfactorily resolved through coordination with the U.S. Fish and Wildlife Service (USFWS), the proposed coal mining and reclamation operations could be restricted or constrained by the State regulatory authority.

(d) **Multiple Mineral Development**

Operations will not be approved which, in the opinion of the Authorized Officer, would unreasonably interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.

161

(e) Oil and Gas/Coal Resources

The BLM realizes that coal mining operations conducted on Federal coal leases issued within producing oil and gas fields may interfere with the economic recovery of oil and gas; just as Federal oil and gas leases issued in a Federal coal lease area may inhibit coal recovery. BLM retains the authority to alter and/or modify the resource recovery and protection plans for coal operations and/or oil and gas operations on those lands covered by Federal mineral leases so as to obtain maximum resource recovery.

(f) Resource Recovery and Protection

Notwithstanding the approval of a resource recovery and protection plan (R2P2) by the BLM, lessor reserves the right to seek damages against the operator/lessee in the event (i) the operator/lessee fails to achieve maximum economic recovery (MER) (as defined at 43 CFR 3480.0-5(21)) of the recoverable coal reserves or (ii) the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal.

The parties recognize that under an approved R2P2, conditions may require a modification by the operator/lessee of that plan. In the event a coalbed or portion thereof is not to be mined or is rendered unminable by the operation, the operator/lessee shall submit appropriate justification to obtain approval by the Authorized Officer to leave such reserves unmined. Upon approval by the Authorized Officer, such coal beds or portions thereof shall not be subject to damages as described above. Further, nothing in this section shall prevent the operator/lessee from exercising its right to relinquish all or portion of the lease as authorized by statute and regulation.

In the event the Authorized Officer determines that the R2P2, as approved, will not attain MER as the result of changed conditions, the Authorized Officer will give proper notice to the operator/lessee as required under applicable regulations. The Authorized Officer will order a modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such an ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in the first paragraph under this section.

Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the Authorized Officer that the coal reserves have been rendered unminable or at such time that the operator/lessee has demonstrated an unwillingness to extract the coal.

The BLM may enforce this provision either by issuing a written decision requiring payment of the MMS demand for such royalties, or by issuing a notice of non-compliance. A decision or notice of non-compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law.

(g) Public Land Survey Protection

The lessee will protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, obliteration, or damage during operations on the lease areas. If any monuments, corners or accessories are destroyed, obliterated, or damaged by this operation, the lessee will hire an appropriate county surveyor or registered land surveyor to reestablish or restore the monuments, corners, or accessories at the same location, using surveying procedures in accordance with the "Manual of Surveying Instructions for the Survey of Public Lands of the United States". The survey will be recorded in the appropriate county records, with a copy sent to the Authorized Officer.

APPENDIX C

THREATENED, ENDANGERED OR CANDIDATE SPECIES

APPENDIX C
PROTECTION OF THREATENED AND ENDANGERED SPECIES

Introduction

The Endangered Species Act (16 U.S.C. 1531-1543) protects plant and animal species that are listed as threatened and endangered (T&E) as well as their critical habitats. Endangered species are defined as those that are in danger of extinction throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered in the foreseeable future throughout all or a significant portion of their range. Candidate species include species for which the US Fish and Wildlife Service (USFWS) has sufficient data to list as T&E but for which listing is precluded by a higher priority action.

In a letter dated October 25, 1999, the USFWS advised the Bureau of Land Management (BLM) that the following threatened, endangered, proposed, candidate species may be present in the area of the Belle Ayr 2000 federal coal lease application:

Black-footed ferret (endangered)
Bald eagle (threatened)
Mountain plover (proposed)
Ute Ladies' -tresses (threatened)
Swift fox (candidate)
Sturgeon chub (candidate)
Black-tailed prairie dogs (candidate).

Powder River Eagle Studies (PRES) has conducted wildlife monitoring and consulting services for the Belle Ayr Mine since 1984. On April 21, 2000 PRES submitted a letter describing the potential occurrence and impacts to T&E species at the Belle Ayr Mine, including the Belle Ayr 2000 Tract, in response to a joint letter from the USFWS and WDEQ/LQD dated March 24, 2000 to Mr. Phil Dinsmoor of RAG Coal West, Inc. The T&E submittal prepared by PRES addressed the black-footed ferret, bald eagle, mountain plover, and Ute Ladies'-tresses. The submittal stated that the only T&E species observed in the vicinity of the Belle Ayr Mine has been the bald eagle and that those sightings have been irregular and limited to foraging individuals. The submittal was approved by the USFWS, and has been incorporated into the WDEQ/LQD mining permit for the Belle Ayr Mine. The information in the approved submittal is repeated here for those species.

Description of the Proposed Project

The Belle Ayr 2000 coal lease application is for federal coal reserves located adjacent to the Belle Ayr Mine in Campbell County, Wyoming. The application area is located approximately 11 miles south of Gillette, Wyoming. The tract as applied for includes approximately 243.61 acres. All of the Belle Ayr 2000 Tract lies with the existing permit boundary for the Belle Ayr Mine.

Under the Proposed Action, the federal coal in the Belle Ayr 2000 Tract, as applied for by RAG Wyoming Land Company, Inc. would be offered for lease at a competitive sale, subject to standard and special lease stipulations developed for the Wyoming Powder River Basin. These stipulations are listed in Appendix B of this environmental assessment (EA). The Proposed Action assumes that the tract would be developed as a maintenance lease to extend the life of an adjacent existing surface coal mine. As a result, there would not be major changes in facilities, roads or employment. The project area is shown in Figures 1-1 and 1-2 of this EA and additional information about the proposed project is provided in Section 2.1.

Under Alternative 1, the No Action Alternative, the application to lease the federal coal in the Belle Ayr 2000 Tract would be rejected and the tract would not be leased at this time. Selection of Alternative 1 would not affect already approved mining activities at the adjacent mines and other mines in this area. This alternative is discussed in Section 2.2 of this EA, and the adjacent mines are shown in Figure 1-1. No other alternatives were analyzed in detail in this EA.

Land Use Planning Screening Analysis

The Belle Ayr 2000 Tract is included in the area that has been evaluated for acceptability for further lease consideration as part of the coal screening process. The coal screening process is a four part process which includes application of the coal unsuitability criteria for the BLM Buffalo Resource Management Plan. The coal unsuitability criteria, which are defined in 43 CFR 3461.5, are listed in Table 1-3. Unsuitability criterion 9 pertains to federally designated or proposed critical habitat for listed, threatened or endangered plant and animal species, Criterion11 pertains to active bald or golden eagle nests or sites, Criterion 12 pertains to bald and golden eagle roost and concentration areas, and criterion14 pertains to high priority habitat for migratory birds of high federal interest (which includes the mountain plover).

The unsuitability criteria were applied to the area of high and moderate coal potential in the Wyoming Powder River Basin by the BLM and the U.S. Forest Service (USFS) in 1984, as part of the Resource Management Plan for the BLM Buffalo Resource Area, and the Land and Resource Management Plan for the Medicine Bow National Forest and the Thunder Basin National Grassland. The unsuitability criteria were re-evaluated in 1992 and 1993 by the BLM and USFS, and a report of the findings of that screening was prepared in 1997.

In the case of the Belle Ayr 2000 Tract area, there were no unsuitable findings under any of the criteria pertaining to T&E species in either the 1984 or 1992-1993 screening.

As part of the leasing process, all of the coal unsuitability criteria are reviewed site-specifically for each individual lease application based on the most current survey information. The unsuitability findings have been reviewed specifically for the Belle Ayr 2000 Tract, and the findings are summarized in Table 1-3 of this EA. The findings pertaining to T&E species are based on at least 17 years of wildlife surveys of the Belle Ayr 2000 Tract, as it lies within the wildlife monitoring area for the Belle Ayr Mine. These surveys are identified and summarized in the following discussions. There are no unsuitable findings in the case of the Belle Ayr 2000 Tract under any criteria pertaining to T&E species, based on the site specific review of the currently available surveys described in the following paragraphs.

Regulatory Requirements and Mitigation

The issuance of a Federal coal lease grants the lessee the exclusive rights to mine the coal, subject to the terms and conditions of the lease. Lease ownership is necessary for mining federal coal, but lease ownership does not authorize mining operations. No operations can occur on the leased lands until the approval of both the Mineral Leasing Act (MLA) mining plan and the state mining and reclamation permit under the applicable Wyoming state regulations (see section 1.2: Regulatory Authority and Responsibility).

If the Belle Ayr 2000 Tract is leased, the lessee may be required to conduct additional surveys and other evaluations as part of the permit application and approval processes to ensure compliance with the Endangered Species Act. It will be important to confirm the potential, or lack of potential, for impacts to any threatened, endangered, candidate or other special status plant/animal species prior to beginning proposed surface disturbing activities. Coordination with the USFWS during the permit application review process should resolve any potential impacts that are confirmed. If the impacts cannot be satisfactorily resolved, the State regulatory authority would condition any resulting permit to mine coal with species-specific protective measures. The permit application and approval process would be based on the most current survey information and an actual detailed site-specific mining and reclamation proposal.

To inform/remind the lessee of the potential for additional survey and evaluation activity prior to mining, BLM will attach the following stipulation to the lease:

"Threatened, Endangered, Candidate, or Other Special Status Plant and Animal Species

> ***The lease area may contain habitat for the following threatened, endangered, candidate, or other special status plant and animal species: black-footed ferret, bald eagle, mountain plover, Ute Ladies'-tresses, swift fox, sturgeon chub, and black-tailed prairie dog. If surveys performed during the permit application process or future permit revisions indicate that any threatened, endangered, candidate, or other special status plant/animal species could be impacted by proposed coal mining and reclamation operations located on this lease and the potential impacts to that species cannot be satisfactorily resolved through coordination with the U.S. Fish and Wildlife Service (USFWS), the proposed coal mining and reclamation operations could be restricted or constrained by the State regulatory authority."***

The following is a partial list of measures that the state of Wyoming could require as part of the mining and reclamation permit in accordance with the state regulatory requirements:

- Avoiding bald eagle disturbance;
- Restoring bald eagle foraging areas disturbed by mining;
- Restoring mountain plover habitat;
- Using raptor safe power lines;
- Surveying for Ute Ladies'-tresses if habitat is present;
- Surveying for mountain plover if habitat is present;
- Surveying for black-footed ferrets if prairie dogs move onto tract.

Ute Ladies'-tresses (__Spiranthes diluvialis__)

Existing Environment

Ute Ladies'-tresses is a federally-listed threatened member of the orchid family identified by the USFWS as potentially occurring on the Belle Ayr 2000 tract. Typical suitable habitat for Ute Ladies'-tresses is found along perennial or ephemeral streams with subirrigation into late July or August. ESCO Associates Inc. conducted special vegetation surveys of the entire permit area, including the Belle Ayr 2000 Tract, for Ute Ladies'-tresses, a threatened orchid species, in May and August, 1996. No individuals were identified in either survey. The Ute Ladies'-tresses requires consistently well-wetted conditions. The Belle Ayr 2000 Tract is comprised of upland agricultural land that is too dry for the occurrence of this species. Even the area along Draw No. 2, at best a moist swale, lacks the sustained wet conditions required by the orchid.

Effects of the Proposed Project

If a federal coal lease is issued for the Belle Ayr 2000 Tract under the Proposed Action, Ute Ladies'-tresses would not be likely to be directly or indirectly impacted because typical suitable habitat for this species does not exist on the tract. If a lease is issued for the tract, mining operations could not be initiated until the MLA mining plan and the state mining and reclamation permit are approved. If future surveys of the tract do locate this species on the wetlands that are not considered typical suitable habitat for this species prior to surface disturbing activities, coordination with the USFWS during the permit application review process should resolve any potential conflicts.

As a result, issuing a federal coal lease for the Belle Ayr 2000 Tract under the Proposed Action is not likely to adversely affect the Ute Ladies'-tresses orchid or its habitat.

Bald Eagle (Haliaeetus leucocephalus)

Existing Environment

The bald eagle is a federally-listed threatened species. It is a common winter resident and migrant in Campbell County, and has been observed foraging on the area during past surveys. This species has winter roost sites in southern Campbell County, but not in northern Campbell County. Since 1984, the Belle Ayr 2000 Tract has been surveyed annually for all raptors by Powder River Eagle Studies (PRES) in accordance with mining permit and USFWS requirements. Bald eagles have been observed foraging in the vicinity of the Belle Ayr 2000 Tract during these surveys, but there are no suitable roost sites for the bald eagle in the area. Additionally, there are no trees large enough to support an eagle nest within at least three miles of the Belle Ayr 2000 Tract.

Effects of the Proposed Project

If a lease is issued for the Belle Ayr 2000 Tract under the Proposed Action, bald eagle foraging habitat would be lost on the tract during mining and before reclamation. The loss of any potential prey habitat would be short-term. Foraging habitat that is lost during mining would be replaced as reclamation continues on already mined out areas. Eagles may alter foraging patterns as they fly around areas of active mining activity. Potential for bald eagles to collide with or be electrocuted by electric power lines on the mine site is minimal due to use of raptor safe power lines.

The Belle Ayr 2000 Tract does not include any suitable roosting habitat or trees large enough to support an eagle nest. If a lease is issued for the tract, mining operations could not be initiated until the MLA mining plan and the state mining and reclamation permit are approved. If future surveys of the tract identify that the situation has changed and that bald eagle roosting or nesting habitat could be impacted by mining activities on the tract, coordination with the USFWS during the permit application review process should resolve potential conflicts.

As a result, issuing a federal coal lease for the Belle Ayr 2000 Tract under the Proposed Action is not likely to adversely affect the bald eagle or its habitat.

Black-footed Ferret (Mustela nigripes)

Existing Environment

The black-footed ferret is a federally-listed endangered species. Black-footed ferrets are found almost exclusively living in prairie dog towns, and prairie dogs are the main prey source for the black-footed ferret. Since 1984, the Belle Ayr 2000 tract has been surveyed annually for small mammals by PRES. No prairie dog colonies have been identified on the Belle Ayr 2000 Tract during these surveys. The nearest town is more than 4.5 miles to the northwest, across Highway 59. No evidence of black-footed ferrets has been found during surveys of prairie dog towns located in the general area of the Belle Ayr 2000 Tract. As a result, ferrets would not be expected to occur in the area.

Effects of the Proposed Project

If a federal coal lease is issued for the Belle Ayr 2000 Tract under the Proposed Action, black-footed ferrets would not be likely to be directly or indirectly impacted because prairie dog towns, the typical suitable habitat for this species, are not currently located on the tract. If a lease is issued for the tract, mining operations could not be initiated until the MLA mining plan and the state mining and reclamation permit are approved. If future surveys of the tract find that prairie dogs have moved onto the tract prior to surface disturbing activities, coordination with the USFWS during the permit application review process should resolve potential conflicts.

As a result, issuing a federal coal lease for the Belle Ayr 2000 Tract under the Proposed Action is not likely to adversely affect the black-footed ferret or its habitat.

Mountain Plover (Charadrius montanus)

Existing Environment

The mountain plover is proposed for listing as threatened. It breeds in areas of dry short-grass vegetation and may be associated with prairie dog colonies.

Mountain plovers have never been recorded on or within one mile of the Belle Ayr permit area since PRES began wildlife monitoring in 1984. Further, no habitat typically used by mountain plovers has been observed on the Belle Ayr 2000 Tract. Vegetation on and near the vast majority of the Belle Ayr Mine permit area is comprised of big sagebrush (*Artemisia tridentata*)-grassland, grassland, seeded grassland, and reclaimed grassland. The visually dominant grassy elements in all of those types are mid-grasses, such as wheatgrasses (*Agropyron* spp.) and needlegrasses (*Stipa* spp.). Such vegetation creates cover too dense and high to be considered typical plover habitat. The absence of prairie dog towns within 1.75 miles of the permit area further reduces the probability that plovers would be observed in the area. Although mountain plovers are not expected to occur at Belle Ayr Mine, species-specific protective measures for these birds have been incorporated into the mine's permit.

Effects of the Proposed Project

If a federal coal lease is issued for the Belle Ayr 2000 Tract under the Proposed Action, mountain plovers would not be likely to be directly or indirectly impacted because the typical suitable habitat for this species, short grass prairies and/or prairie dog towns, are not currently located on the tract. If a lease is issued for the tract, mining operations could not be initiated until the MLA mining plan and the state mining and reclamation permit are approved. If future surveys of the tract find that mountain plover habitat exists on the tract prior to surface disturbing activities, coordination with the USFWS during the permit application review process should resolve potential conflicts.

As a result, issuing a federal coal lease for the Belle Ayr 2000 Tract under the Proposed Action is not likely to jeopardize the mountain plover or its habitat.

Swift Fox (Vulpes velox)

Existing Environment

The swift fox is a candidate species. The swift fox has never been observed on or near the Belle Ayr 2000 Tract during wildlife monitoring conducted by PRES since 1984. The swift fox has never been recorded in the area and is not expected to be found there due to the lack of abundant grassland or short shrub habitats.

Effects of the Proposed Project

If a federal coal lease is issued for the Belle Ayr 2000 Tract under the Proposed Action, swift foxes would not be likely to be directly or indirectly impacted because the typical suitable habitat for this species is not currently located on the tract and swift foxes have never been recorded in the area. If a lease is issued for the tract, mining operations could not be initiated until the MLA mining plan and the state mining and reclamation permit are approved. If future surveys of the tract

171

find that swift fox habitat on the tract prior to surface disturbing activities, coordination with the USFWS during the permit application review process should resolve future potential conflicts prior to authorization of surface disturbing activities.

As a result, issuing a federal coal lease for the Belle Ayr 2000 Tract under the Proposed Action is not likely to adversely affect the swift fox or its habitat.

Sturgeon Chub (Macrhybopsis gelida)

Existing Environment

Habitat for the sturgeon chub does not exist within the area. This species requires large perennial streams with silty bottoms. This species is found within the Big Horn and Powder River drainages, but the LBA tract is located within the Belle Fourche River drainage.

Effects of the Proposed Project

If a federal coal lease is issued for the Belle Ayr 2000 Tract under the Proposed Action, the sturgeon chub would not be likely to be directly or indirectly impacted because the typical suitable habitat for this species does not exist on the tract. If a lease is issued for the tract and future surveys identify potential sturgeon chub habitat prior to surface disturbing activities, coordination with the USFWS during the permit application review process should resolve potential conflicts prior to authorization of surface disturbing activities

As a result, issuing a federal coal lease for the Belle Ayr 2000 Tract under the Proposed Action is not likely to adversely affect the sturgeon chub or its habitat.

Black-tailed Prairie Dog

Existing Environment

The black-tailed prairie dog is a candidate species. As discussed above, the Belle Ayr 2000 Tract has been surveyed for prairie dog towns by PRES since 1984. There are no prairie dog colonies on the LBA tract, the nearest town is approximately 4.5 miles away.

Effects of the Proposed Project

If a federal coal lease is issued for the Belle Ayr 2000 Tract under the Proposed Action, prairie dogs would not be likely to be directly or indirectly impacted because prairie dog towns are not currently located on the tract. If a lease is issued for the tract and future surveys of the tract find that prairie dog towns have been established on the tract prior to surface disturbing activities, coordination with the USFWS during the permit application review process should resolve any potential conflicts. Habitat where prairie dogs could establish towns would be lost during mining but would be replaced as reclamation occurs on already mined out areas.

As a result, issuing a federal coal lease for the Belle Ayr 2000 Tract under the Proposed Action is not likely to adversely affect the black-tailed prairie dog or its habitat.

No Action Alternative (Alternative 1)

Under the No Action Alternative, the Belle Ayr 2000 Tract application would be rejected and the tract would not be leased at this time. Mining activities at the adjacent mines would be limited to already approved disturbance to remove coal from existing leases. Coal would not be removed from the Belle Ayr 200 Tract, but some mining-related surface disturbance would occur to allow removal of coal from the adjacent existing federal coal leases.

Under Alternative 1, impacts to Ute ladies' tresses, mountain plover, swift fox, and sturgeon chub would not be expected to be different than described above for the Proposed Action because the Belle Ayr 2000 Tract does not include any typical suitable habitat for these species. For the bald eagle, selection of Alternative 1 would mean that eagle foraging habitat would not be lost on the LBA tract during mining and eagle foraging patterns would not be affected by mining activity on the LBA Tract. As indicated above, there is no bald eagle roosting or nesting habitat on the tract at this time. For the prairie dog and black-footed ferret, selection of Alternative 1 would mean that the area of the Belle Ayr 2000 Tract would remain available for future prairie dogs towns. There are no prairie dog towns currently located on the tract, or within 4.5 miles.

Cumulative Effects

Existing activities in the Powder River Basin which could impact T&E species include oil and gas development (including coal bed methane), surface coal mining, uranium mining, sand and gravel mining, proposed power plant and railroad line construction, ranching, and recreational activities such as hunting. Mining and construction activities tend to have more intense impacts on fairly localized areas, while ranching, recreational activities, and oil and gas development tend to be less intensive but spread over larger areas. Oil and gas development and mining activities have requirements for reclamation of disturbed areas as resources are depleted. The net area of energy disturbance in the Wyoming Powder River Basin is increasing overall, however, as new areas of disturbance are added, mined-out areas are restored and reclaimed and oil and gas well sites are reclaimed when depleted oil and gas wells are abandoned.

Issuing a lease for the Belle Ayr 2000 Tract would not be expected to change potential cumulative impacts to T&E species in the Powder River Basin. The tract is proposed as a maintenance lease for an existing mine. If it is leased under the Proposed Action, mining activities would gradually move from the existing Belle Ayr leases onto the LBA Tract. As the mining activities move off the existing leases, restoration of the land surface and reclamation would occur in the mined-out areas of the existing leases. The habitat on the newly leased area would not be available for use by previously resident species during mining operations, but the newly reclaimed areas on the existing leases would become available for use by wildlife. The existing mining facilities, transportation facilities and workforce would be used to mine the new lease. The mining activities would be extended by 2 years. The applicant, RAG Wyoming Land, Inc. has indicated production and employment will remain constant if the Belle Ayr 2000 Tract is leased under the Proposed Action.

References and Personal Contacts

References considered in this appendix are included in Section 6 in this EA. Ms. Gwyn McKee of PRES was contacted personally in preparation of this appendix.

APPENDIX D

REGULATORY COMPLIANCE OR MITIGATION REQUIRED BY STIPULATIONS OR REQUIRED BY STATE OR FEDERAL LAW

RESOURCE	Regulatory Compliance or Mitigation Required by Stipulations or Required by State or Federal Law[1]	MONITORING[1]
Topography & Physiography	Restoring to approximate original contour or other approved topographic configuration	LQD checks as-built vs. approved topography with each annual report.
Geology & Minerals	Identifying & selectively placing or mixing chemically or physically unsuitable overburden materials to minimize adverse effects to vegetation or groundwater	LQD requires monitoring in advance of mining to detect unsuitable overburden.
Soil	Salvaging soil suitable to support plant growth for use in reclamation; Protecting soil stockpiles from disturbance and erosional influences; Selectively placing at least 4 ft of suitable overburden on the graded spoil surface below replaced topsoil to meet guidelines for vegetation root zones	Monitoring vegetation growth on reclaimed areas to determine need for soil amendments. Sampling regraded overburden for compliance with root zone criteria.
Air Quality	Dispersion modeling of mining plans for annual average particulate pollution impacts on ambient air; Using particulate pollution control technologies; Using work practices designed to minimize fugitive particulate emissions; Using EPA- or state-mandated BACT, including: Fabric filtration or wet scrubbing of coal storage silo and conveyor vents, Watering or using chemical dust suppression on haul roads and exposed soils, Containment of truck dumps and primary crushers; Covering of conveyors, Prompt revegetation of exposed soils	On-site air quality monitoring for PM_{10} or TSP; Off-site ambient monitoring for PM_{10} or TSP; On-site compliance inspections
Surface Water	Building and maintaining sediment control ponds or other devices during mining; Restoring approximate original drainage patterns during reclamation; Restoring stock ponds and playas during reclamation	Monitoring storage capacity in sediment ponds; monitoring quality of discharges; monitoring streamflows and water quality.
Groundwater Quantity	Evaluating cumulative impacts to water quantity associated with proposed mining; Replacing existing water rights that are interrupted, discontinued, or diminished by mining with water of equivalent quantity	Monitoring wells track water levels in overburden, coal, interburden, underburden, & backfill

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[1] These requirements, mitigation plans, and monitoring plans are in place for the existing Belle Ayr Mine in their current approved mining and reclamation plan (the No-Action Alternative) and for the Proposed Action.

RESOURCE	Regulatory Compliance or Mitigation Required by Stipulations or Required by State or Federal Law[1]	MONITORING[1]
Groundwater Quality	Evaluating cumulative impacts to water quality associated with proposed mining; Replacing existing water rights that are interrupted, discontinued, or diminished by mining with water of equivalent quality	Monitoring wells track water quality in overburden, coal, interburden, underburden, & backfill
Alluvial Valley Floors	Identifying all alluvial valley floors that would be affected by mining; Determining significance to agriculture of all identified alluvial valley floors affected by mining (WDEQ); Protecting downstream alluvial valley floors during mining; Restoring essential hydrologic function of all alluvial valley floors affected by mining.	Monitoring to determine restoration of essential hydrologic functions of any declared AVF
Wetlands	Identifying all wetlands that would be affected by mining; Identifying jurisdictional wetlands (COE); Replacing all jurisdictional wetlands that would be disturbed by mining Replacing functional wetlands as required by surface managing agency or surface land owner	Monitoring of reclaimed wetlands using same procedures used to identify premining jurisdictional wetlands.
Vegetation	Permanently revegetating reclaimed areas according to a comprehensive revegetation plan using approved permanent reclamation seed mixtures consisting predominantly of species native to the area; Reclaiming 20% of reclaimed area with native shrubs at a density of one per square meter; Controlling erosion on reclaimed lands prior to seeding with final seed mixture using mulching, cover crops, or other approved measures; Chemically and mechanically controlling weed infestation; Direct hauling of topsoil; Selectively planting shrubs in riparian areas; Planting sagebrush; Creating depressions and rock piles; Using special planting procedures around rock piles; Posting reclamation bond covering the cost of reclamation	Monitoring of revegetation growth & diversity until release of final reclamation bond (minimum 10 years). Monitoring of erosion to determine need for corrective action during establishment of vegetation. Use of controlled grazing during revegetation evaluation to determine suitability for postmining land uses.

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[1] These requirements, mitigation plans, and monitoring plans are in place for the existing Belle Ayr Mine in their current approved mining and reclamation plan (the No-Action Alternative) and for the Proposed Action.

RESOURCE	Regulatory Compliance or Mitigation Required by Stipulations or Required by State or Federal Law[1]	MONITORING[1]
Wildlife	Restoring premining topography to the maximum extent possible; Planting a diverse mixture of grasses, forbs and shrubs in configurations beneficial to wildlife; Designing fences to permit wildlife passage; Raptor-proofing power transmission poles; Creating artificial raptor nest sites; Increasing habitat diversity by creating rock clusters and shallow depressions on reclaimed land; Cottonwood plantings along reclaimed drainages; Replacing drainages, wetlands and alluvial valley floors disturbed by mining; Reducing vehicle speed limits to minimize mortality; Instructing employees not to harass or disturb wildlife; Preparing raptor mitigation plans	Baseline & annual wildlife monitoring surveys; Monitoring for Migratory Birds of High Federal Interest
Threatened, Endangered, & Candidate Species	Avoiding bald eagle disturbance; Restoring bald eagle foraging areas disturbed by mining; Restoring mountain plover habitat disturbed by mining; Using raptor safe power lines; Surveying for Ute ladies' tresses; Surveying for mountain plover; Searching for black-footed ferrets if prairie dogs move onto tract;	Baseline and annual wildlife monitoring surveys
Land Use	Suitably restoring reclaimed area for historic uses (grazing and wildlife);	Monitoring of controlled grazing prior to bond release evaluation.
Cultural Resources	Conducting Class I & III surveys to identify cultural properties on all state and federal lands and on private lands affected by federal undertakings; Consulting with SHPO to evaluate eligibility of cultural properties for the NRHP; Avoiding or recovering data from significant cultural properties identified by surveys, according to an approved plan; Notifying appropriate federal personnel if historic or prehistoric materials are uncovered during mining operations; Instructing employees of the importance of and regulatory obligations to protect cultural resources	Monitoring of mining activities during topsoil stripping; cessation of activities and notification of authorities if unidentified sites are encountered during topsoil removal.

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[1] These requirements, mitigation plans, and monitoring plans are in place for the existing Belle Ayr Mine in their current approved mining and reclamation plan (the No-Action Alternative) and for the Proposed Action.

178

RESOURCE	Regulatory Compliance or Mitigation Required by Stipulations or Required by State or Federal Law[1]	MONITORING[1]
Native American Concerns	Notifying Native American tribes with known interest in this area of leasing action and request for help in identifying potentially significant religious or cultural sites	No specific monitoring program
Paleontological Resources	Notifying appropriate federal personnel if potentially significant paleontological sites are discovered during mining	No specific monitoring program
Visual Resources	Restoring landscape character during reclamation through return to approximate original contour and revegetation with native species	No specific monitoring program
Noise	Protecting employees from hearing loss	MSHA inspections
Transportation Facilities	Relocating existing pipeline, if necessary, in accordance with specific agreement between pipeline owner and coal lessee.	No specific monitoring program
Socioeconomics	Paying royalty and taxes as required by federal, state, and local regulations.	Surveying and reporting to document volume of coal removed.
Hazardous & Solid Waste	Disposing of solid waste and sewage within permit boundaries according to approved plans; Storing and recycling waste oil; Maintaining of files containing Material Safety Data Sheets for all chemicals, compounds, and/or substances used during course of mining; Ensuring that all production, use, storage, transport, and disposal of hazardous materials is in accordance with applicable existing or hereafter promulgated federal, state, and government requirements; Complying with emergency reporting requirements for releases of hazardous materials as established in CERCLA, as amended; Preparing and implementing spill prevention control and countermeasure plans, spill response plans, inventories of hazardous chemical categories pursuant to Section 312 of SARA, as amended; Preparing emergency response plans;	No specific monitoring other than required by these other regulations and response plans.

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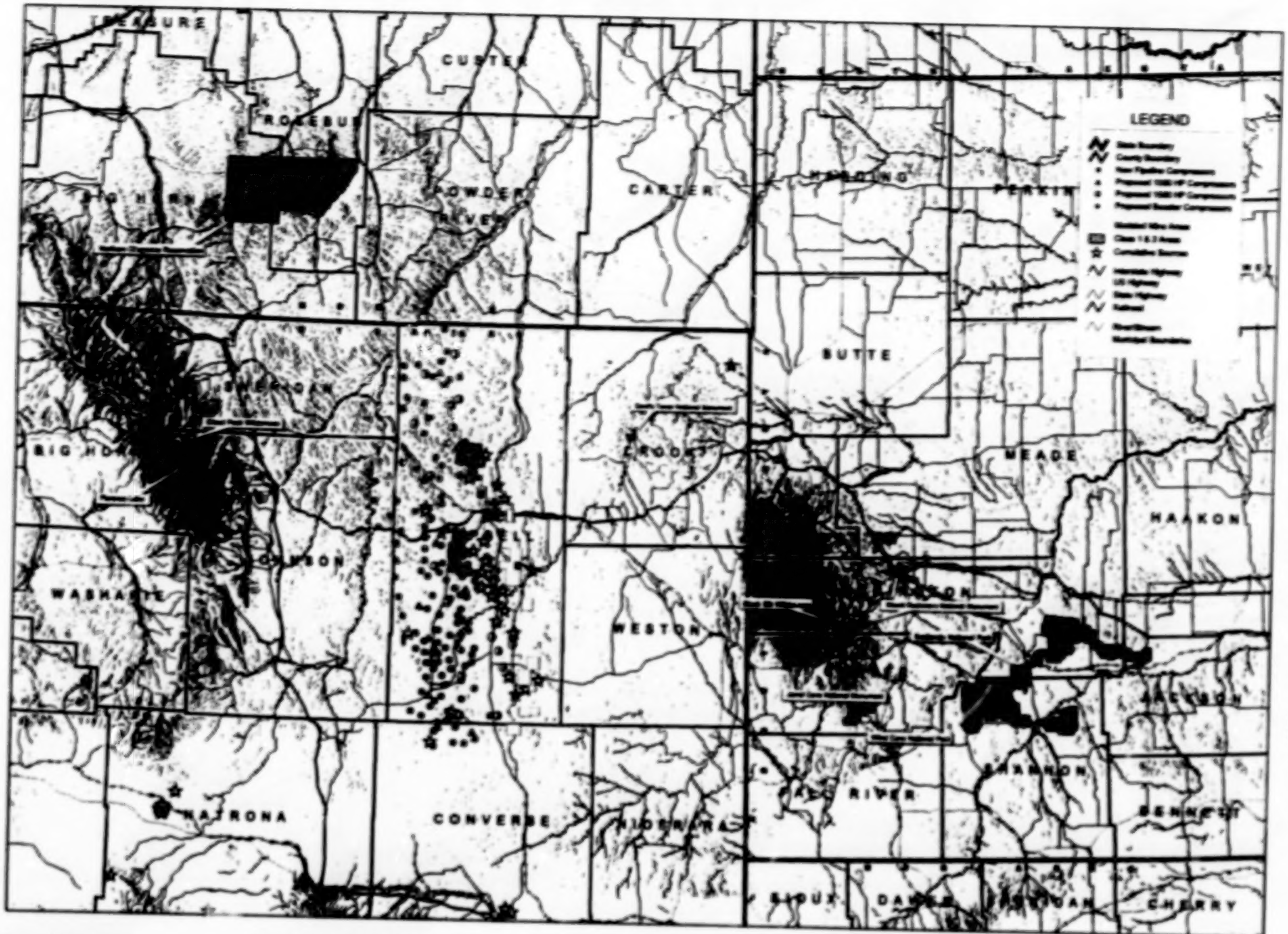
[1] These requirements, mitigation plans, and monitoring plans are in place for the existing Belle Ayr Mine in their current approved mining and reclamation plan (the No-Action Alternative) and for the Proposed Action.

APPENDIX E

SUMMARY OF HORSE CREEK EIS CUMULATIVE AIR QUALITY ANALYSIS RESULTS



Transverse Mercator Projection
1927 North American Datum
Zone 13

Note: Map is from Wyodak CBM Project
Air Quality Technical Reference
Document (Greystone 1999).

Table E-1
Cumulative Pollutant Emissions for Far-Range Air Quality/AQRV Analysis

Source	Emissions after 1995 (tons/year)					Percent of Total				
	NO_x	SO_2	EC	OC	PM_{10}	NO_x	SO_2	EC	OC	PM_{10}
Coal Mining Sources										
Coal Mines Incremental increase (NO_x from blasting, trains, vehicles)	2,475					12.2	0.0	0.0	0.0	0.0
Coal Mines Incremental increase of fugitive dust					4,234	0.0	0.0	0.0	0.0	24.2
Coal Mines Incremental increase from mining vehicles		698	193	73	86	0.0	10.6	55.0	54.5	0.5
Coal Trains Incremental increase	7,262	888	158	61	70	35.9	13.4	45.0	45.5	0.4
Wyodak CBM Sources										
Proposed Compressors	2,806					13.9	0.0	0.0	0.0	0.0
Road Dust from Vehicle Traffic					11,224	0.0	0.0	0.0	0.0	64.2
Fugitive Dust from Disturbed Areas					956	0.0	0.0	0.0	0.0	5.5
Project Vehicle Exhaust	18					0.1	0.0	0.0	0.0	0.0
Other Sources										
Other Point Sources	7,662	5,032			917	37.9	76.0	0.0	0.0	5.2
Total	**20,223**	**6,618**	**351**	**134**	**17,487**	**100**	**100**	**100**	**100**	**100**

Source: Horse Creek EIS Cumulative Air Quality Analysis (BLM, 2000)

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Figure E-2

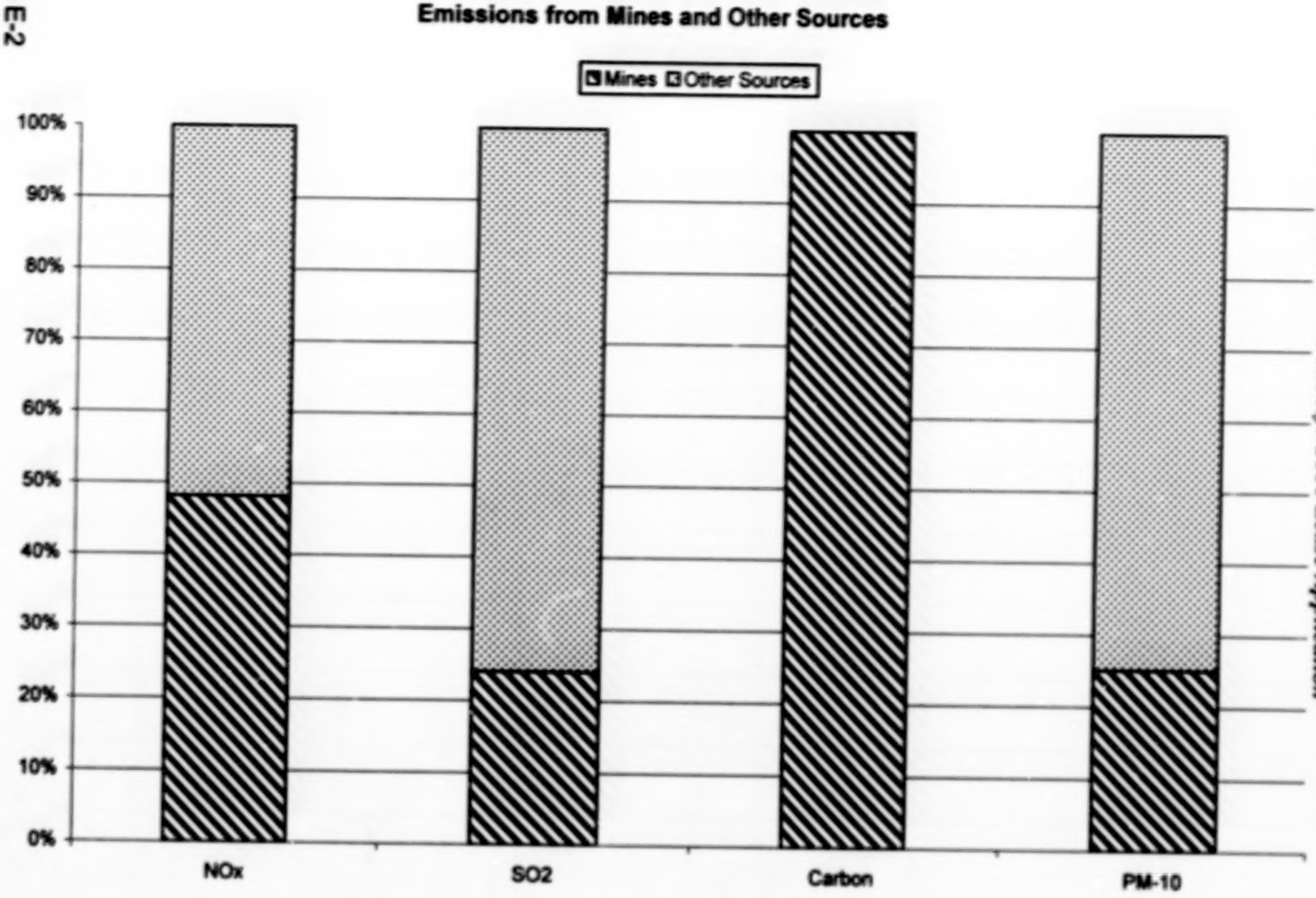
Emissions from Mines and Other Sources
▨ Mines ▨ Other Sources
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
NOx
SO2
Carbon
PM-10

Table E-2
Cumulative Far-field Concentrations (Percent of Standard)

Area	Annual NO_2	24-hr PM_{10}	Annual PM_{10}	3-hr SO_2	24-hr SO_2	Annual SO_2
CUMULATIVE IMPACTS						
Northern Cheyenne	1.2	14.5	0.25	6.4	11.2	1.0
Badlands National Park, SD	50.4	16.2	1.25	14.4	24	10.5
Wind Cave National Park, SD	6.4	15.5	0.75	8.68	16.8	4
Class I PSD Increment	2.5	4	8	25	5	2
Black Elk Wilderness, SD	0.09	0.69	0.1	0.19	0.22	0.088
Jewel Cave National	0.13	0.51	0.16	0.30	0.24	0.13
Mt. Rushmore National	0.08	0.67	0.10	1.93	0.15	0.075
Cloud Peak Wilderness, WY	0.01	0.60	0.026	1.08	0.08	0.013
Devils Tower National	0.13	0.53	0.32	0.22	0.14	0.088
National Ambient Air Quality Standard	100	150	50	1300	365	80
Wyoming Standard				260	60	

Source: Horse Creek EIS Cumulative Air Quality Analysis (BLM, 2000)

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Figure E-3

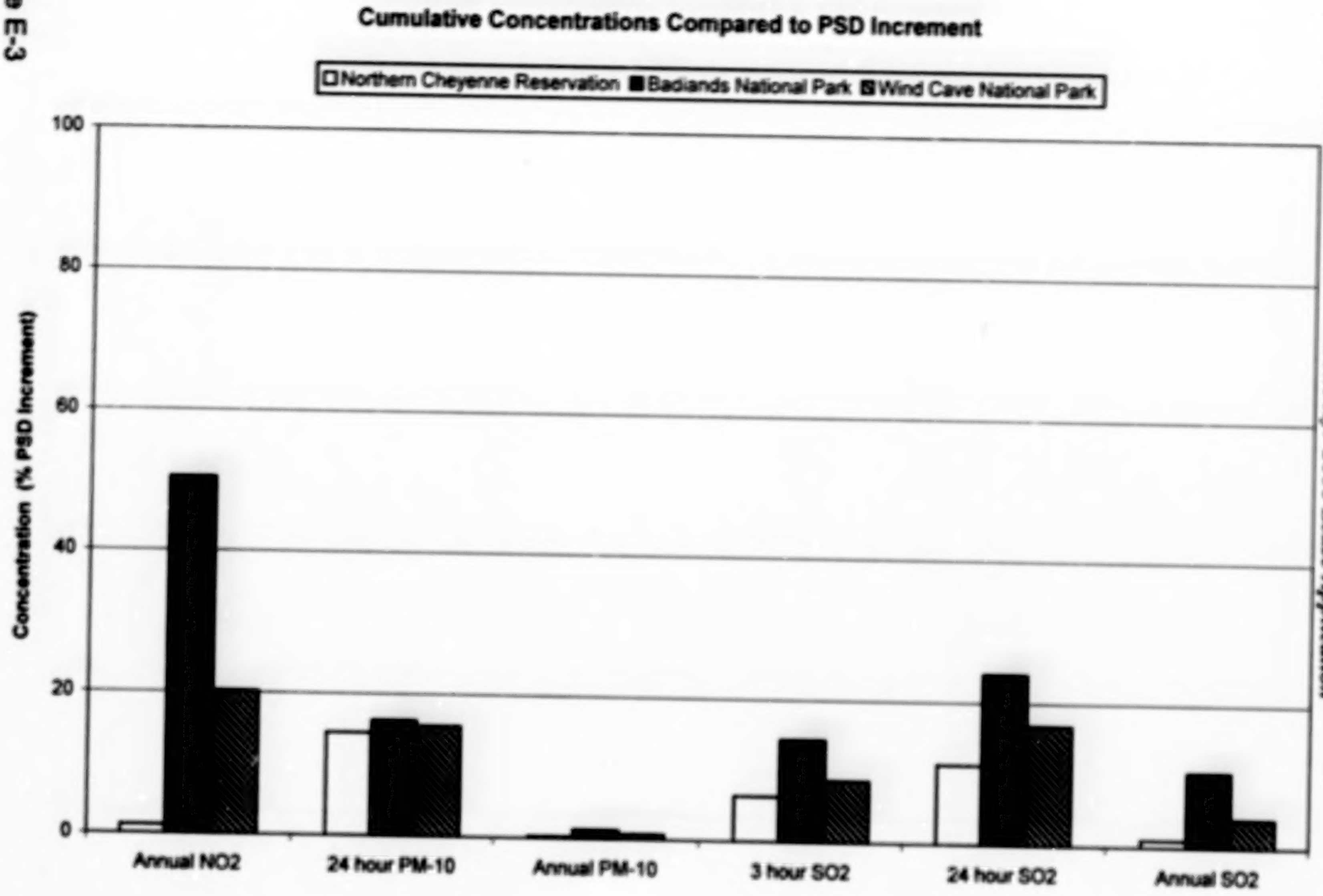

Cumulative Concentrations Compared to PSD Increment
☐ Northern Cheyenne Reservation
■ Badlands National Park
▨ Wind Cave National Park
Concentration (% PSD Increment)
100
80
60
40
20
0
Annual NO2
24 hour PM-10
Annual PM-10
3 hour SO2
24 hour SO2
Annual SO2

Figure E-4

Cumulative Concentration Compared to Wyoming and National Standards

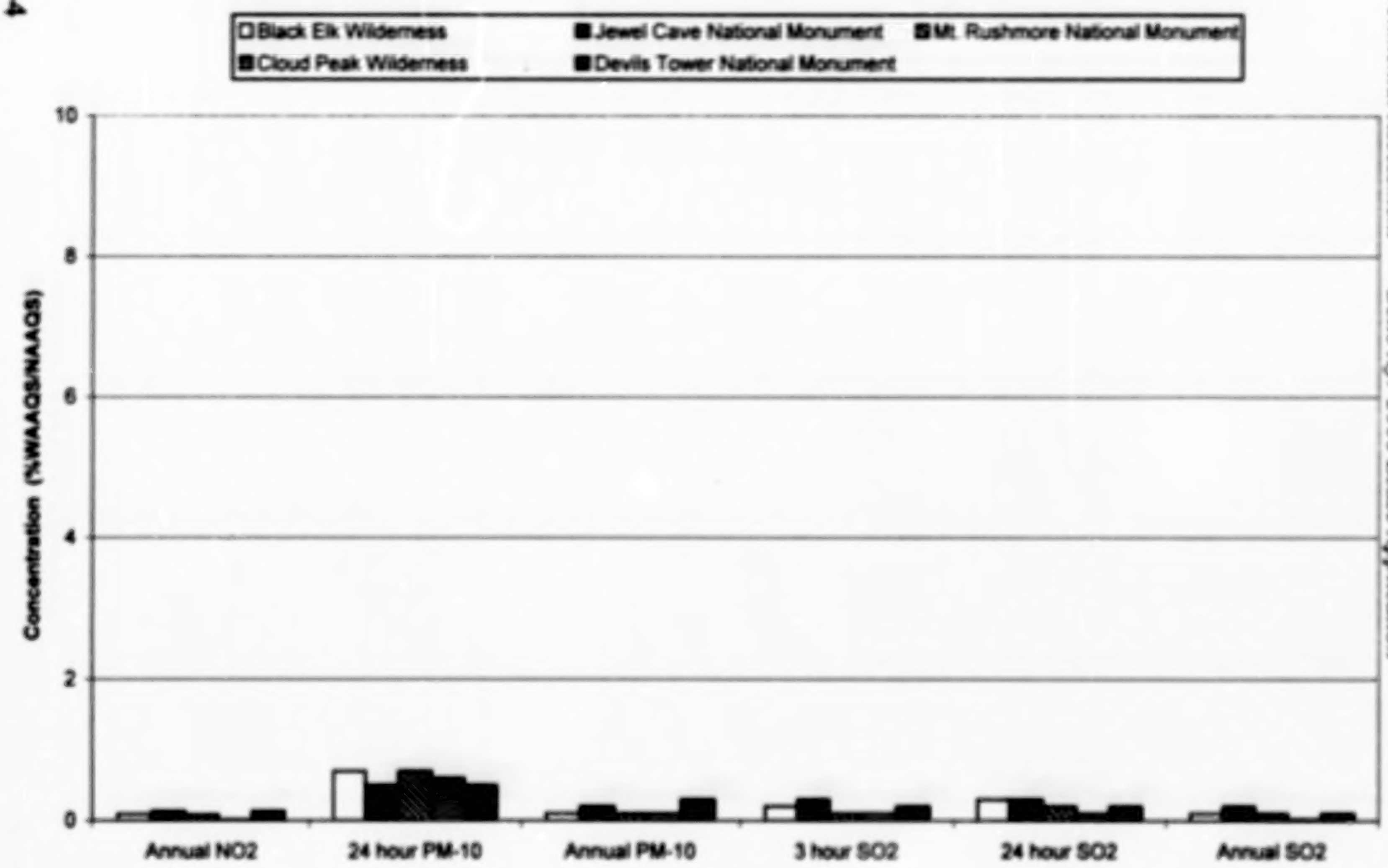


Table E-3
Predicted Annual Days of Visibility Reductions At Class I and Class II Sensitive Areas from Cumulative Sources

Location	Type of Area	Number of Days deciview change >0.5	Number of Days deciview change >1.0
Northern Cheyenne Reservation	Class I	18	8
Badlands National Park	Class I	173	70
Wind Cave National Park	Class I	94	45
Black Elk Wilderness	Class II	86	28
Jewel Cave National Monument	Class II	72	32
Mt. Rushmore National Monument	Class II	58	22
Cloud Peak Wilderness	Class II	15	4
Devils Tower National Monument	Class II	70	28

Note: The Northern Cheyenne Reservation is a redesignated Class I area and is not addressed by existing visibility regulations which apply to the federally mandated Badlands and Wind Cave Class I areas.

Source: Horse Creek EIS (BLM, 2000)

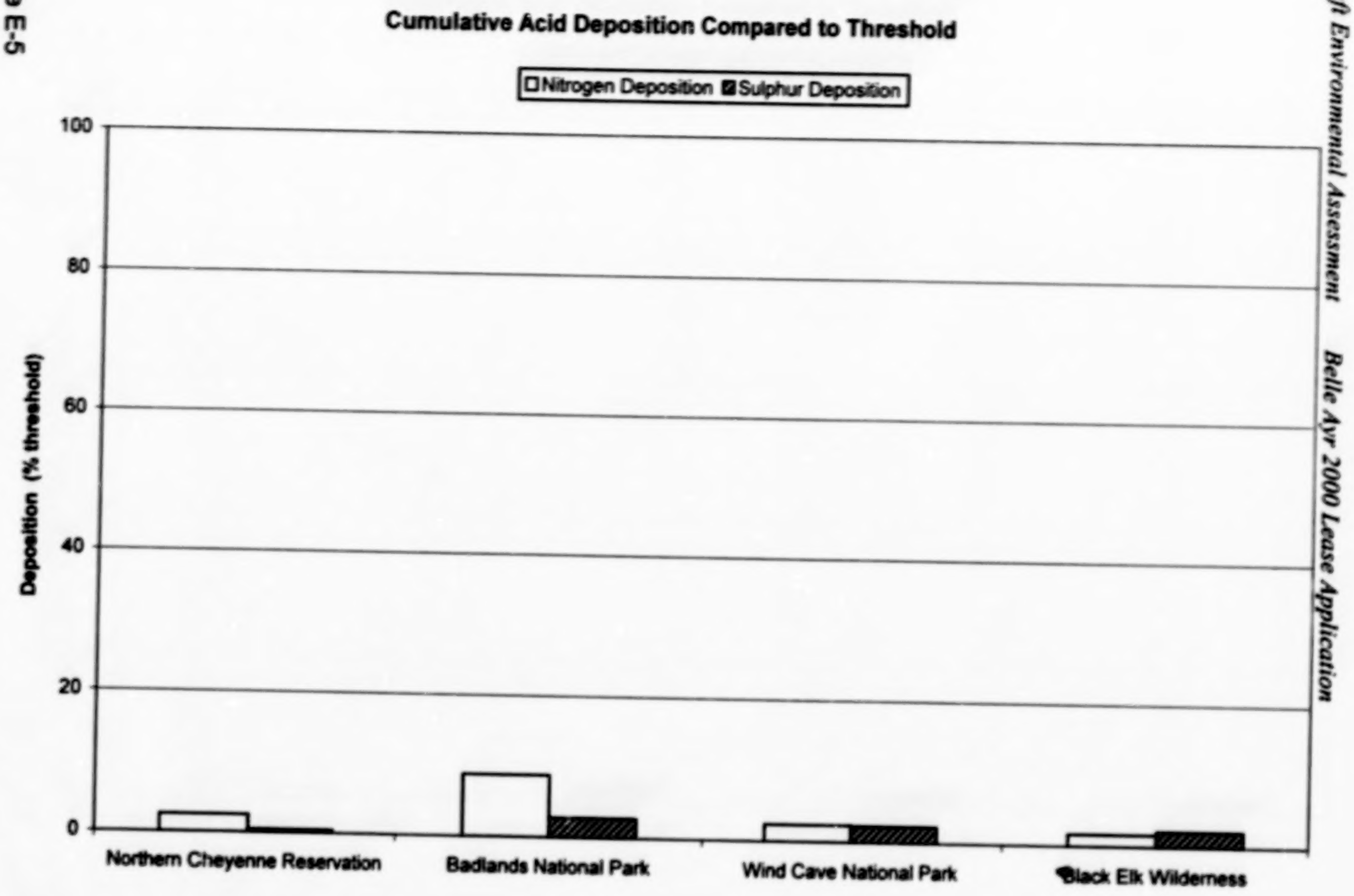
187

Table E-4
Predicted Levels of Acid Deposition from Cumulative Sources
(lb/acre/year)

Area	Significance Level	Total Nitrogen Deposition	Total Sulfur Deposition
Northern Cheyenne Reservation	2.7 - 4.5	0.067	0.011
Badlands National Park	2.7 - 4.5	0.238	0.075
Wind Cave National Park	2.7 - 4.5	0.066	0.061
Black Elk Wilderness	2.7 - 4.5	0.047	0.059
Jewel Cave National Monument	2.7 - 4.5	0.051	0.076
Mt. Rushmore National Monument	2.7 - 4.5	0.030	0.050
Cloud Peak Wilderness	2.7 - 4.5	0.004	0.006
Devils Tower National Monument	2.7 - 4.5	0.044	0.055

Source: Horse Creek EIS (BLM, 2000)

Figure E-5



189

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